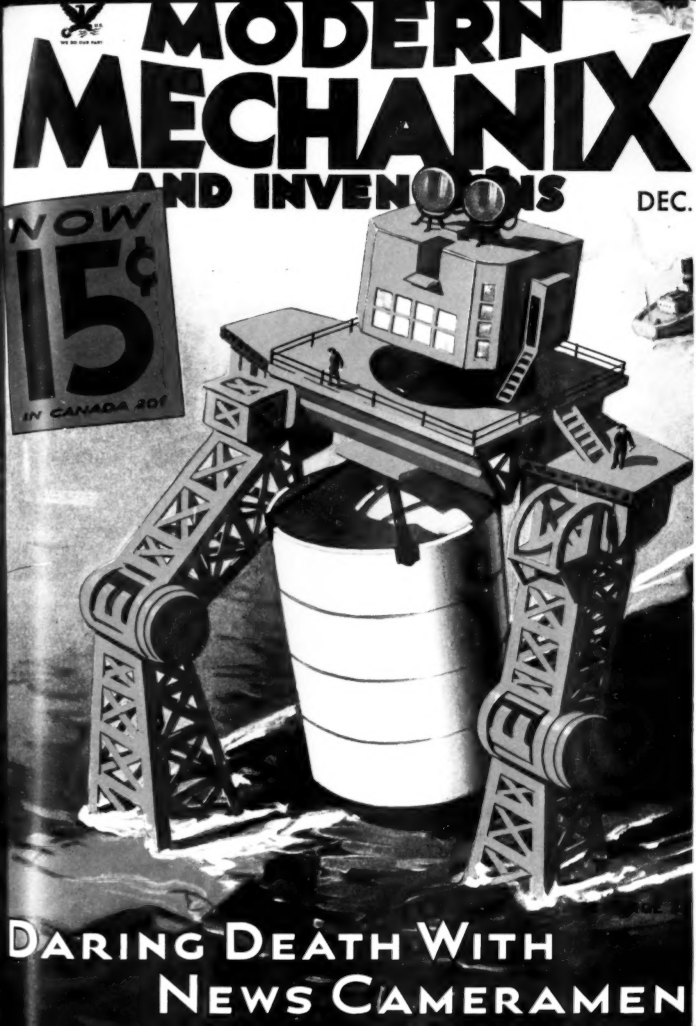
MODERN MECHANIX AND INVENTIONS

DEC.

NOW 15¢

IN CANADA 20¢



DARING DEATH WITH NEWS CAMERAMEN

The Boy who Discovered the $1150.00 Candle

How Dennis Collins Won Fame and a Big Award With His Gilbert Chemistry Outfit

"I have always wanted to be a chemist, and when my Dad gave me a Gilbert Chemistry Outfit, I was the happiest boy alive. I knew Mr. Gilbert made the finest chemistry sets in the world—and a boy can't be a good chemist unless he has good chemicals."

"Every day I made new discoveries. I learned how to make invisible ink—how to change water into milk. One afternoon I took some of my chemicals, mixed them with wax and made a mysterious looking candle . . . and when I lit it, it burst into a blue flame."

"I wrote to several big chemical companies about my process, and before long one of them offered me $1,150.00 in cash plus a contract guaranteeing me a 3-year position in their laboratories. Gee, it was swell to get that check, and you bet I'm glad I became a Gilbert Chemist."

$100 *award to every boy who patents a chemical process*

"Wonderful discoveries have been made in chemistry, but I believe even more wonderful ones are yet to be made. I would like to see more boys win honors like Dennis Collins. To every boy owning a Gilbert Chemistry Outfit and who secures a United States patent on a chemical process before he is 18 years old, I will present a check for $100.00."

A. C. Gilbert

The new Gilbert Inventor's Laboratory Outfit makes you a real chemist. It contains enough chemicals to make hundreds of compounds—test tubes, mortar and pestle and other fascinating equipment. Packed in a handsome laboratory kit, with metal work tray and detachable legs. Complete with three exciting books. *Chemistry*, *Chemical Magic* and *Glass Blowing*, $10.00. Other Gilbert Outfits from $1 up.

Ask to see them at your local dealer's. But be sure it's a Gilbert outfit.

Inventor's Outfit

How would *you* like to do what Dennis Collins has done! Have a chemical laboratory of your own. Make chemicals change color—transform liquids into sparkling crystals — and explore thousands of other chemical mysteries. You might even make a brand-new discovery and sell it for a lot of money.

OUTFIT No. 12

Free Chemistry Book—Fill out this coupon and mail it today for free copy of Mr. Gilbert's new Book, "How to Become a Chemist," illustrating and describing each outfit and telling you about the exciting experiments you can perform. Send for your copy now.

Mr. A. C. Gilbert, The A. C. Gilbert Co.,
359 Erector Square, New Haven, Conn.

Please send—free—illustrated book, "How to Become a Chemist."

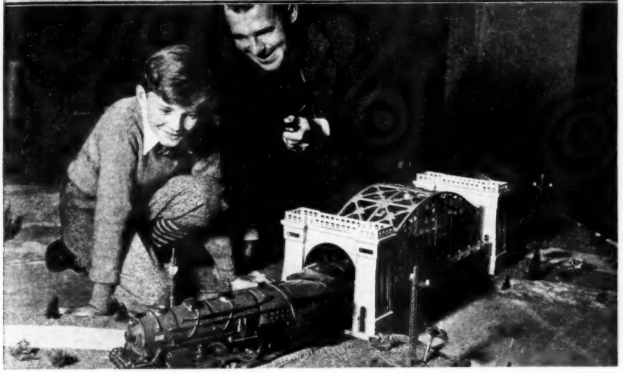
Name .....

Street .....

City ..... State .....

To the luckiest men in the world

A FATHER AND SON WHO ARE PALS



THIS Christmas give your son a present that will cement the partnership between you—and do more—help him to become quick-thinking and resourceful. Such a gift is a Lionel Electric Train. For Lionel Trains are more than toys. They teach boys how to develop skill with their hands and brains. They help boys form the habit of thinking problems out for themselves. Your boy will not only have the fun of building and operating a model railroad, but the opportunity to tackle actual problems of railroad operation.

Help him learn as he plays

Take the coupon below to a Lionel dealer and get, FREE, *the new 56-page Lionel Model Railroad Planning Book* that shows (1) how to plan and build a model railroad system, (2) what to get to make it true to life to the last detail. *Note:* If it is not easy to go to a Lionel dealer—mail the coupon and we will send this expensive book if you send 10¢ to cover handling and mailing costs.

Chug! Chug! Chug!

Now Lionel Electric Trains *sound* as well and *look* like *real* trains . . . they chug like actual locomotives. This "CHUGGER" device is an exclusive Lionel feature. And for the first time all Lionel Electric Trains have REMOTE CONTROL, which enables you to start, stop or reverse the locomotive from any distance. Lionel Electric Trains can be bought for as little as $7.95. . . Lionel-Ives Electric Trains with Transformer-Station from $5.75. . . Lionel-Ives Mechanicals (for junior) as low as $1.25. (*Prices subject to change.*)

Tune in *on Lionel's thrilling* "True Railroad Adventures." *Every Wednesday at 5:00 P. M. and Sunday at 4:00 P. M., E. S. T., over NBC-WJZ Network starting November 5th. Look in your newspaper under* "True Railroad Adventures."

LIONEL CORPORATION, Dept, I-2, 15 East 26th St., N. Y. C.

I enclose 10c to cover handling and mailing costs for my copy of the new Lionel Railroad Planning Book.

Name_____

Street_____

City_____ State_____

LIONEL *Electric* TRAINS

National Salesmen's Training Assn.,
Dept. W-706, N. S. T. A. Bldg.,
Chicago, Ill.

Without cost or obligation you may send me your free book, "The Key to Master Salesmanship."

Name .....

Address .....

City ..... State.....

Age..... Occupation.....

They Laughed When I Mailed This Coupon

..But It Brought Me The Book That Showed Me How to Make $10,000 a Year!

As I walked up to the mail box, Joe nudged Ed and winked facetiously for my benefit.

"Sh!" he hissed in a loud stage-whisper. "This is going to be the big turning point in Frank Parker's life! He's writing for a book that tells how to get into salesmanship. Pretty soon he'll be earning so much that he'll make the rest of us look like gikers!"

Ed snickered.

"Won't it be grand!" he grinned. "Now he can quit punching time-clocks and eating 40-cent lunches." He raised his voice. "Drop me a postal sometime when you get out into big business and start making $10,000 a year, will you, Frank!"

They both laughed uproariously. And probably it **did** seem like a joke to them that a $30 a week clerk would have the nerve to think he could ever get anywhere or make real money without some special "gift" or "pull."

But they laughed too soon. Just yesterday I sat down and wrote to Ed who is still at the shop, dragging along at the same old job.

"Dear Ed"—I wrote. "You asked me to send you a card when I got into big business and started making $10,000 a year. Well here's your card. Yesterday I was promoted to the job of Assistant Sales Manager of the Western Metal Works, at a salary that goes with it. I'll loan you my copy of that book on salesmanship you used to think was such a joke."

Only a book! Just seven ounces of paper and printers' ink—but it contains one of the most vivid and inspiring messages that any ambitious man can read. It reveals the real truth about the art of selling, explains the science of selling in simple terms, and tells exactly how the great sales records of nationally-known star salesmen are achieved. And not only that—it outlines a simple plan that will enable almost any man to master scientific salesmanship without spending a moment on the road—without losing a day or a dollar from his present position.

A Few Weeks—Then Bigger Pay

Reason it out for yourself. Salesmanship offers bigger returns and delivers them quicker than any other line of work under the sun. But many people have subscribed to the foolish notion that a man has to be "born" with some sort of "gift" for salesmanship. Nothing could be farther from the truth. Just like any other profession, salesmanship is governed by certain fundamental rules and laws—laws which you can master as easily as you learned the alphabet.

Right now an unusual demand for salesmen is being reported. City and traveling sales positions are open in nearly every line all over the country. Last year requests for over 50,000 trained men were received. This employment service is free to both employers and employees, and thousands have secured excellent positions this way.

Free to Every Man

See for yourself **why** "The Key to Master Salesmanship" has been the deciding factor in the careers of so many men who are now making $2,000 to $10,000 a year. See how J. W. Haulman, of Baltimore, Md., used his N. S. T. A. training to more than double his income—in spite of "hard times." Find out how H. A. Lamy of Montreal, Canada, first doubled and later tripled his income. Learn for yourself the REAL truth about the art of selling! If we were asking $2 or $3 a copy you might hesitate. But the book is now FREE. You do not risk one penny nor incur the slightest obligation. And since it may alter your entire future, it certainly is worth your time to fill out and clip the coupon at the top of this page. Why not do it now!

National Salesmen's Training Association
Dept. W-706
N.S.T.A. Bldg. Chicago, Ill.

Where Shall We Send Your Copy—FREE!

MAIL COUPON ABOVE TODAY

Thank You for Mentioning Modern Mechanics and Inventions for December When Writing to Advertisers

PRICE 15 CENTS
(20 CENTS IN CANADA)

MODERN MECHANIX AND INVENTIONS

NRA MEMBER U.S. WE DO OUR PART

Volume XI DECEMBER, 1933 Number 2

CONTENTS FOR DECEMBER

SPECIAL FEATURES

Mechanical News of the Month - - 30

Daring Death with News Cameramen - 32
By Ted Dalton

Young Mister Cord—Titan of Transportation - - - - - - 40

World's Largest Statue Carved in Mountain - - - - - - - 44

Behind the Scenes with Movie Sound Fakers - - - - - - 46
By Murray Spivak

Strategy of New U. S. Aerial Patrol Traps "Sky Smugglers" - - - 52
By Raymond Spencer

Oddities of Science - - - - - 56
By Nic Sprank

Glass Furniture One of Latest Household Appliances - - - - - 60

Galaxy of Huge Bridges for San Francisco-Oakland - - - - 62

Hunting Down Animal Outlaws of the West - - - - - - 68
By James Nevin Miller

Modified Stock Car Racing - - - 74
By Robert M. Roof

SHORTER FEATURES

Dread Sleeping Sickness Baffles Science - - - 38
Palatial Ice Speedster Carries Nine - - - - - - 39
Balbo Plans Daring Non-stop World Flight - - 43
Interesting Facts about Locomotives - - - - - 50
$150 Cash Prizes for Novel Cigarette Holders - - 55
New Air Conditioner Improves Auto Comfort - - - 65
$25 Cash Prizes for Answers to Shotgun Recoil Problem 66
Camera Sculptures Faces from Subjects - - - 67
Super Zeppelin Is 175 Feet Longer than Akron - - 71
Fortunes in Needed Inventions - - - - - 95
By R. F. Yates
Be a Character Actor—Here's the Makeup - - 102
Freak Musical Stunts Make Fun and Profits - - - 104
Defend Yourself by Police Methods - - - - 109
A Bungalow that's Hard to Beat - - - - - 114
By Maurice J. Flagg
Hobby Department - - 116

BIG HOW-TO-BUILD ARTICLES

Plans for "Tahiti"—a Sailing Cruiser - - - 86
By John G. Hanna
"Wanderer"—a Two-Wheel Cabin Trailer - - - 96
By E. S. Purdom
Light Your Home with This Windmill Generator - - 100
Handy Rig for Trekking a Light-Weight Boat - - 106
By Dick Wood

(Continued on page 6)

Published monthly by Modern Mechanix Publishing Co., 529 So. 7th St., Minneapolis, Minn., U.S.A. Entered as Second Class matter Sept. 20th, 1928, at Minneapolis, Minn. Copyright 1933. Advertising offices Chicago, 25 E. Wacker Drive; New York, 52 Vanderbilt Ave. Printed in U.S.A.

TABLE OF CONTENTS — Continued From Page 5

NEW MECHANICAL INVENTIONS

Golf Club Cart Abolishes Caddy - - - 37
Radio-cooked Toast Never Tastes Burned - 42
Periscope for Bridge Kibitzers - - - 42
New Clamp Grips Work Firmly - - - 42
Fly Your Plane and Never Crash! - - 51
Machine Induces Artificial Fever - - 51
Comical Masks Guard Racers from Face Wounds - - - - - - - 58
Boots, Hunting Suit, Blind for Duck Hunters 59
Motor Has Two Pistons to Cylinder - - 59
Bottles Keep Car Battery Watered - - 59
Items of Interest to the Housewife
Electrical Can Opener - - - - - 60
Motorized Nail Buffer - - - - 60
Automatic Tea Maker - - - - - 60
Complete Kitchen in Cabinet - - - 60
Bar and Radio in One - - - - - 61
Home Barette - - - - - - - 61
Glass Furniture - - - - - - 61
Hostess Tray - - - - - - - 61
Midget Drill Press for Workbench - - 65
Whistling Beacons Mark Airfield for Blind Landings - - - - - - 70
Moving Shelves Pass Customers in New Self-Service Store - - - - 72
Auto Compass Guides Drivers - - - 72
Bullet-Proof Shield Protects Police Officers in Gun Battles - - - - - - 73
Midget Cars Mechanize Infantry - - 73
Rotary Mower Has Vacuum Suction - - 73

INTERESTING SCIENTIFIC ITEMS

Frozen Honey Is New Delicacy - - - 37
Chemical Diet Will Prolong Life - - 42
Children Grow Faster in Fall - - - 58
Fast Action Camera Shows Fundamentals of Football Kicking - - - - - 58
Jumping Sand Makes Sandpaper - - - 70
Tall Periscope Aids Golfers - - - 70
Urge Alcohol Gas for Farm Relief - - 71
Seedless Tomato Grown in Texas - - 72
Microscope Magnifies 20,000 Times - - 72
Vision Perpetual Motion in Rubber Band Engine - - - - - - - 78
Walking Sponge Shocks Science - - 78
Man-made Fever Cures Insanity - - 108

FOR THE HOME CRAFTSMAN

Old Blocks Save Concrete Cost - - - 78
Simple Aquarium Aerator - - - - 84
Light Flashes on When Tracing Board Drawer Is Opened - - - - - - 84
Copying Pictures Is Easy with a Cross-Lined Glass Guide - - - - - - - 85
Delicate Fans Carved from Wood - - - 85
Etching Steel with Rubber Stamp - - - 85
Electric Spikes Roast Weinies - - - - 85
Window Greenhouse Shows Summer View During Winter - - - - - - - 94
Explore Bottom of Lake with This Novel Diving Helmet - - - - - - - 103
Cellophane, Substitute for Tail Light - - 103
Camera Light from Bread Pan - - - - 103
Fool Your Friends with a Magic Color Producing Bottle - - - - - - 108
Wheel Makes Unique Chandelier - - - 108
Cars Run with Leather Bearings - - - 108
Plants Thrive Indoors Under Lights from Ordinary Bulbs - - - - - - 110
Battery Charger and Garage Made from Junk 110
A Cute Cage for Your Pet Fly - - - - 110
Electric Sander Renews Old Floors - - - 111
Electric Heater Warms and Decorates Rooms 112
Build a Sturdy Trailer for Your Bike - - 113

FOR RADIO FANS

Waterpipe Ground Brings in Signals Louder and Clearer - - - - - - - 91
Calibrating Receiver, Meter Dial for Close Readings - - - - - - - 91
This Handle Saves Wear and Tear on Plug-in Coils - - - - - - - - 91
Winder for Thousand-turn Coils Makes Counting Easy - - - - - - - 92
Filament Circuit Tester Prevents Tube Blowouts - - - - - - - - 92
"B" Eliminator Delivers 90 Volts for 1 and 2 Tube Sets - - - - - - 93
Wires Wrapped in Cellophane Make Neutralizing Condenser - - - - - 93

Chips from the Editor's Workbench will be found this month on page 14

HANDIKINKS

Tire Well on Car Is Ideal for Testing Tubes - 79
Solder Stops Noise in Water Faucet - - 79
Paper Clip Holds Artist's Model on Board - 79
Inner Tube Carries Water from Rainspout - 80
Tire Casings Used for Traffic Signs in Street 80
Easy Method to Waterproof Canvas - - - 80
Stripe Your Tools to Prevent Losing Them - 81
Method for Shearing Wire - - - - - - 81
Notch in Angle Iron to Guide Hacksaw - 81
Handy Insulation Stripper - - - - - 81
Bottle Cutter Makes Attractive Glasses - - 82
Novel Two-edged Grass Sickle - - - - 82
Using Up Small Soap Scraps - - - - 82
Here's Novel Way to Roast Weiners - - - 83
Old Carbide Can Saves Heat - - - - 83
Kink to Make an Ordinary Triangle Adjustable 83
This Device Tells If Door Is Locked - - 83

Douglas Rolfe
Plane Talk Editor

Pilot Gene Shank
Famous Aviator, Holder of Light Plane Endurance Flight Record

S. S. Rabl
Seaplane Designer and Naval Architect

EDITED BY EXPERTS

Listed here are the members of the Modern Mechanix Board of Editors, all qualified by national repute to serve as authorities. They will gladly answer questions from readers if stamped envelope is sent. Address them in care of this magazine, 529 S. 7th St., Minneapolis, Minn.

A. Neely Hall
Author of "The Boy Craftsman," etc.

L. B. Robbins
Nationally Known Radio Expert

Alfred Albelli
New York Editor

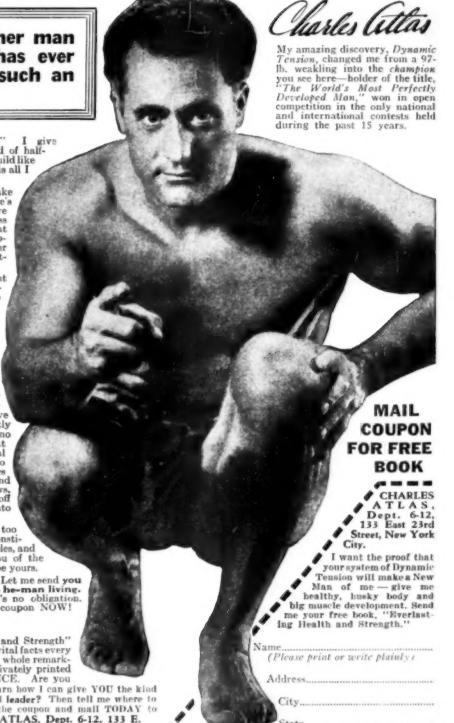
Ray F. Kuns
Principal, Cincinnati Automotive Trade School

J. Russell Dye
Associate Editor

William J. Kostka
Associate Editor

"One Week from To-night You'll See PROOF that I can make You a New Man!"

NOTE—No other man in the world has ever DARED make such an offer!



Charles Atlas

My amazing discovery, *Dynamic Tension*, changed me from a 97-lb. weakling into the *champion* you see here—holder of the title, *"The World's Most Perfectly Developed Man,"* won in open competition in the only national and international contests held during the past 15 years.

I GIVE MORE than "promises." I give PROOF! If you're sick and tired of half-baked ideas—if you really **want** a build like mine—then **one week**, just 7 DAYS, is all I need to **prove** I can give it to you!

You've **got** a body, man. Why not make it a real handsome **man's** body! There's NO good reason why you shouldn't have rippling cords of mighty muscle across your neck and shoulders. No reason at all why your chest shouldn't be strapping, big and husky like mine—your arms and legs powerful—your wind lasting—your vigor and pep **100%**!

I used to be a sickly, half-pint runt weighing only 97 lbs.—a "laughing-stock" wherever I went. No fun. No friends. Right there I almost "fell" for some of these freak spring or weight contraptions to make me "strong." But THEN—by a lucky break of my life—I discovered **Dynamic Tension.**

Apparatus is OUT!

Look at me now. You don't see any skinny, flabby, no-account bag of bones **here,** do you? This is what my remarkable secret has done for **my** body. Twice—against all comers—I have won the title, "World's Most Perfectly Developed Man." No wonder I've got no use for tricky apparatus or machines that may strain your heart or other vital organs. I've found the **natural** way to build the husky, solid, fighting muscles that Nature **means** for you to have! And I've shown thousands of other fellows, many of them probably much worse off than you, how to develop themselves into champions MY way!

I'll give you clean-cut health **inside,** too —show you exactly how to get rid of constipation, poor digestion, bad breath, pimples, and other weaknesses that are robbing you of the good times and things in life that can be yours.

Now make me PROVE I can do it. Let me send you the FREE Book that can be the door to **he-man** living. Just tell me where to send it. There's no obligation. But—be MAN enough to send the coupon NOW!

FREE BOOK

My big book, "Everlasting Health and Strength" —packed with actual photographs and vital facts every fellow must know to face life—tells the whole remarkable story of **Dynamic Tension.** Privately printed for me, it's FREE if you act AT ONCE. Are you ready to learn my secret?—ready to learn how I can give YOU the kind of body that will make you a masterful **leader?** Then tell me where to send your copy of my book. Fill in the coupon and mail TODAY to me personally. Address: **CHARLES ATLAS, Dept. 6-12, 133 E. 23rd St., New York City.**

MAIL COUPON FOR FREE BOOK

CHARLES ATLAS, Dept. 6-12, 133 East 23rd Street, New York City.

I want the proof that your system of Dynamic Tension will make a New Man of me—give me healthy, husky body and big muscle development. Send me your free book, "Everlasting Health and Strength."

Name.....
(Please print or write plainly)

Address.....

City.....

State.....

© 1933. C. A. Ltd.

I'll Train You Quickly for RADIO'S

LEARN AT HOME

Get into this Field with a Future

MY BOOK, "Rich Rewards in Radio," gives you full information on the opportunities in Radio and explains how I train beginners at home to become Radio Experts and how I train experienced servicemen for better Radio jobs—better pay. It's free. Clip and mail the coupon NOW. Radio's amazing growth has made thousands of fine jobs which pay $40, $60, $75 a week. Many of these jobs lead to higher salaries.

Radio—the Field with a Future

Once or twice in a man's lifetime a new invention starts a new business. You have seen how the men and young men who got into the automobile, motion picture, and other industries when they were started had the first chance at the big jobs—the $5,000, $6,000 and $7,500 a year jobs. Radio offers the same chance that made men rich in those businesses. It has already made many men independent and will make many more wealthy in the future. You will be kicking yourself if you pass up this once-in-a-lifetime opportunity for financial independence.

Many Radio Experts make $40, $60, $75 a Week

In the short space of a few years, 300,000 Radio jobs have been created, and thousands more will be made by its future development. Men with the right training—the kind of training I will give you in the N. R. I. Course—have stepped into Radio at 2 and 3 times their former salaries. Experienced servicemen as well as beginners praise N. R. I. training for what it has done for them.

Many make $5, $10, $15 a week in spare time almost at once

My Course is world-famous as the one "that pays for itself." The day you enroll I send you instructions, which you should master quickly, for doing 28 Radio jobs common in most every neighborhood. Throughout your Course I will show you how to do other repair and service jobs on the side for extra money. I will not only show you how to do the jobs, but how to get them. I'll give you the plans and ideas that have made $200 to $1,000 a year for N. R. I. men in their spare time. G. W. Page, 110 Raleigh Apts., Nashville, Tenn., wrote me: "I made $935 in my spare time while taking your Course." Leo J. Kelly, 1430 Jefferson Ave., Toledo, O., reports $1,800 in one year. Many others make $5, $10, $15 a week in spare time almost at once.

Broadcasting stations employ trained men continually for jobs paying up to $5,000 a year.

Television—the coming field of many great opportunities—is covered by my Course.

HERE'S PROOF

$400.00 Each Month

"I spent fifteen years as traveling salesman and was making good money but could see the opportunity in Radio. Believe me, I am not sorry. I have made more than $400 each month and it really was your Course that brought me to this."—J. G. Dahlstead, Radio Sta. KYA, San Francisco, Cal.

$500 a Year Extra in Spare Time

"Although only doing spare time Radio work, I averaged about $500 extra a year in addition to my regular income. My example and that of hundreds of other N.R.I. graduates should convince any skeptical person of the superiority of N.R.I. training."—Edward H. Fawcett, Slough Road, Radnor, R. C., Canada.

$50 to $75 a Week

"I am in the radio service business for myself, where it is possible for me to make $50 to $75 a week. Service work has increased because people, who in normal times would buy a new Radio, now are contented to have the old one 'tapped up'."—Bernard Costa, 150 Franklin St., Brooklyn, N. Y.

You Get Practical Experience

—I Will Give You Special Radio Equipment Without Extra Charge

My Course is not all theory. I'll show you how to use my special Radio equipment for conducting experiments and building circuits which illustrate important principles used in such well-known sets as Westinghouse, General Electric, Philco, R.C.A., Victor, Majestic, and others. You work out with your own hands many of the things you read in our lesson books.

With N. R. I. equipment your learn to build and thoroughly understand set testing equipment—you can use N. R. I. equipment in your spare-time service work for extra money.

Act! MAIL COUPON *Today* - - - Get The Facts About

GOOD Spare Time and Full Time Jobs

TO MAKE MORE MONEY

Many Make $40, $60, $75 a Week

SPECIAL FREE OFFER

I'll send you a **Free Lesson** to prove that my Radio Course is easy, practical. That's how confident I am that I can train YOU at home in your spare time to become a Radio expert. Only my students could have this offer. I'll prove that what I say is true. I'll send, in fact, I KNOW that what I say is true. I'll send, in addition, my 64-page book, free, to anyone who asks for it. It tells you about Radio, explains clear, simple way of teaching Radio. I KNOW my training. I have ALREADY trained thousands of men. Many of them with no more than common school education, and no Radio or electrical experience, have become Radio experts and earn two or three times their former pay. Mail the coupon now.

Spare time set servicing pays many N. R. I. men $5, $10, $15 a week extra. Full time men make as much as $40, $60, $75 a week.

Loud Speaking and Public Address Equipment is another growing Radio field—it offers many money-making opportunities to trained men.

Course." My book, "Rich Rewards in Radio," gives many letters from students who earned four, five, and six times their tuition fee before they graduated.

Get ready for jobs like these

Broadcasting stations use engineers, operators, station managers, and pay up to $5,000 a year. Radio manufacturers employ testers, inspectors, foremen, engineers, servicemen, buyers, and managers for jobs paying up to $6,000 a year. Radio dealers and jobbers (there are over 35,000) employ servicemen, salesmen, buyers, managers and pay up to $100 a week. Radio operators on ships enjoy life, see the world, with board and lodging free, and get good pay besides. There are hundreds of opportunities for you to have a spare time or full time Radio business of your own—to be your own boss. I'll show you how to start your own business with practically no capital—how to do it on money made in spare time while learning. My book tells you of other opportunities. Be sure to get it at once. Just clip and mail the coupon.

You can learn at home in your spare time to be a Radio Expert

Hold your job. There is no need for you to leave home. I will train you quickly and inexpensively during your spare time. You don't have to be a high school or college graduate. My Course is written in a clear, interesting style that most anyone can grasp. I give you practical experience under my 50-50 method of training—one-half from lesson books and one-half from practical experiments with equipment given without extra charge. This unique and unequalled method has been called one of the greatest developments in correspondence Radio training. N. R. I. pioneered and developed it. It makes learning at home easy, fascinating, practical.

Television, Short Wave, Loud Speaker Systems Included

There's opportunity for you in Radio. Its future is certain. Television, short wave, loud speaker systems, police Radio, automobile Radio, aircraft Radio—in every branch, development and improvements are taking place. Here is a real future for thousands and thousands of men who really know Radio—men with N. R. I. training. Get the training that opens the road to good pay and success.

Your Money Back if you are Not Satisfied

I will give you an agreement in writing, legal and binding upon this Institute, to refund every penny of your money upon completing my Course if you are not satisfied with my Lessons and Instruction Service. The resources of the National Radio Institute, Pioneer and World's Largest Home-Study Radio School, stand behind this agreement.

Find out what Radio offers you Get my book AT ONCE

One copy of my valuable 64-page book, "Rich Rewards in Radio," is free to any ambitious fellow over 15 years old. It has started hundreds of men and young men on the road to better jobs and a bright future. It has shown hundreds of men who were in blind alley jobs, how to get into easier, more fascinating, better paying work. It tells you what my graduates are doing and making, what Radio jobs pay, how you can quickly and easily fit yourself to be a Radio Expert. The coupon will bring you a copy Free. Send it at once. Your request does not obligate you in any way. ACT NOW.

J. E. SMITH, President
Dept. 3-NH
NATIONAL RADIO INSTITUTE
Washington, D. C.

I have doubled and tripled the salaries of many. Find out about this tested way to BIGGER PAY

Get a Job with a Future

FILL OUT AND MAIL THIS COUPON TODAY

J. E. SMITH, President
National Radio Institute, Dept. 3-NH
Washington, D. C.

Dear Mr. Smith: Please send me your sample lesson "A Bird's Eye View of Radio" and your book, "Rich Rewards in Radio," which points out the opportunities for spare time and full time jobs in Radio and your famous 50-50 method of training men to become Radio Experts through home study. I understand that this places me under no obligation.

(Please Print Plainly)

NAME ..... AGE.....

ADDRESS .....

CITY ..... STATE.....

"R"

The Famous Course That Pays For Itself

Delays May be Costly
PATENT Your Idea Now

DON'T LOSE TIME
Send for Big FREE BOOK

Little Ideas May Have Big Commercial Possibilities

Act at ONCE—and protect your idea. To get the benefits of your invention, you not only have to INVENT it, you have to PATENT it. Many men spend years perfecting an invention, only to find that someone else thinking along the same line has already received a patent on the idea. Delays of only a few days may be vitally important.

Mail the Coupon for FREE Book Today

File your application for a patent at once. Our free book tells you how to proceed and the approximate cost. Take the first step toward getting your patent NOW. Mail the coupon NOW.

Highest References
Strict Secrecy
35 Years of Service

We confine our practice to patents and trademarks. In our 35 years of patent practice we have successfully served thousands of inventors to whom we can refer. It is a distinct advantage to an inventor to employ a Washington attorney as the U. S. Patent Office has no branches. Reasonable charges. Deferred payments.

FREE—"Record of Invention Blank"

Mail the coupon today, and in addition to the free book, we'll send you without charge a Record of Invention Blank. This form, when properly filled out, may be of value to you as evidence should the occasion require. No charge or obligation. **MAIL THE COUPON NOW**

VICTOR J. EVANS & CO.
Established 1898
REGISTERED PATENT ATTORNEYS

VICTOR J. EVANS & CO.,
Main Offices 605M Victor Bldg., Washington, D. C.
Other Offices—1640 Conway Bldg., Chicago; 1007 Wainworth Bldg., New York; 826 Fidelity Bldg., Philadelphia; 514 Empire Bldg., Pittsburgh; 1010 Hobart Bldg., San Francisco.
Please send me your free book 605-M, "How to Obtain a Patent," and your "Record of Invention" blank.

Name .....

Address .....

City ..... State .....

This Is Your Last Chance
To Buy at 1933 Prices

All over the world, thrifty, far-sighted people are going to take advantage of this last chance to buy quality watches at these low prices. We bought these watches for you at bottom prices. When these are gone, even our great buying power will not enable us to continue selling these fine watches and diamonds at such low prices.

Diamond Rings, Wrist Watches

Write for our New Diamond Ring of Romance and Bulova Wrist Watch Catalog, showing marvelous new designs at prices which cannot be continued. Catalog sent FREE. All Watches and Diamonds Sold on Easy Payments.

Don't Delay—Send for Catalog at Once

SANTA FE WATCH COMPANY
Dept. A-36 Thomas Bldg., Topeka, Kan.

FLY this NEW Mystery Ship

"The Flying Phantom" has been designed especially for those who want a fully constructed model. GUARANTEED to FLY. 16 in. wing span; shock and crash-proof construction; covered with oiled Jap. silk cloth; 7 in. carved prop., three rubber motor on covered hooks. A wonderful flyer—send for one now!

Complete Ready to Fly 75c Postpaid.

Send 5c for Complete Catalog.

INTERNATIONAL MODELS CO., 251 W. 57th St., New York, N. Y.

Employment for 500 Men at Once!

A REVOLUTIONARY Chemical Sponge has just been invented that cleans cars like magic. Banishes auto-washing drudgery. Also cleans linoleum, woodwork, windows without work! Auto owners and housewives wild about it.

The manufacturer wants 500 men and women at once to help him introduce this strange chemical sponge. He offers to send one for trial to the first person in each locality who writes him. Send in your name today—also ask for full particulars on how you can get the Agency and without experience or capital make up to $90 a week. *Address:*

Kristee Mfg. Co., 2442 Bar St., Akron, Ohio

Big 3ft. Telescope

5 sections, brass bound. 10-mile range. Study Moon, Stars and distant objects with this powerful 8-p instrument. Special eye piece for viewing Sun included FREE. Makes an ideal Microscope. Guaranteed. Big value. Postpaid $1.85. C. O. D. 15c extra.

BENNER & COMPANY, T-75, TRENTON, N. J.

Get Into the TOY BUSINESS
AS OUR MANUFACTURER

Earn money casting our NEW LINE of hollow Toy Soldiers, Indians, 5 and 10c Automobiles, Ashtrays, etc. No special place or experience necessary as we furnish full instructions with molds and cooperate in selling; also buy finished goods. Chance of a life-time for man with small capital to get into this new and profitable industry. If you mean strictly business and are over 21 write at once for details as CHRISTMAS RUSH is now starting.

METAL CAST PRODUCTS CO. Dept. 2
1696 Boston Road New York

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

Half a Million People
have learned music this easy way

You, too, Can Learn to Play Your Favorite Instrument Without a Teacher

Easy as A-B-C

YES, over half a million delighted men and women all over the world have learned music this quick, easy way.

Half a million—what a gigantic orchestra they would make! Some are playing on the stage, others in orchestras, and many thousands are daily enjoying the pleasure and popularity of being able to play some instrument.

Surely this is convincing proof of the success of the *new, modern method* perfected by the U. S. School of Music! And what these people have done, YOU, too, can do!

Many of this half million didn't know one note from another—others had never touched an instrument—yet in half the usual time they learned to play their favorite instrument. Best of all, they found learning music *amazingly* easy. No monotonous hours of exercises—no tedious scales—no expensive teachers. This simplified method made learning music as easy as A-B-C!

It is like a fascinating game. From the very start you are playing *real* tunes, perfectly, by *note*. You simply can't go wrong, for every step, from beginning to end, is right before your eyes in print and picture. First you are *told* how to do a thing, then a picture *shows* you how, then you do it yourself and *hear* it. And almost before you know it, you are playing your favorite pieces—jazz, ballads, classics. No private teacher could make it clearer. Little theory—plenty of accomplishment. That's why students of the U. S. School of Music get ahead twice as fast—*three times as fast* as those who study old-fashioned, plodding methods.

You don't need any special "talent." Many of the half-million who have already become accomplished players never dreamed they possessed musical ability. They only wanted to play some instrument . . . just like you—and they found they could quickly learn how this easy way. Just a little of your spare time each day is needed—and you enjoy every minute of it. The cost is surprisingly low—averaging only a few cents a day—and the price is the same for whatever instrument you choose. And remember, you are studying right in your own home without paying big fees to private teachers.

Don't miss any more good times! Learn now to play your favorite instrument and surprise all your friends. Change from a wallflower to the center of attraction. Music is the best thing to offer at a party—musicians are invited everywhere. Enjoy the popularity you have been missing. Get your share of the musician's pleasure and profit! Start now!

WHAT INSTRUMENT FOR YOU?

Piano	Piccolo
Organ	Hawaiian Steel Guitar
Violin	
Clarinet	Drums and Traps
Flute	
Harp	Mandolin
Cornet	Sight Singing
Cello	Trombone
Guitar	Piano Accordion
Ukulele	
Saxophone	
Banjo (Plectrum, 5-String or Tenor)	

Voice and Speech Culture
Harmony and Composition
Automatic Finger Control
Italian and German Arranging
Juniors' Piano Course

Free Booklet and Demonstration Lesson

If you are in earnest about wanting to join the crowd of entertainers and be a "big hit" at any party—if you really *do* want to play your favorite instrument, to become a performer whose services will be in demand—fill out and mail the convenient coupon asking for our Free Booklet and Free Demonstration Lesson. These explain our wonderful method fully and show you how easily and quickly you can learn to play at little expense. This booklet will also tell you all about the amazing new *Automatic Finger Control*. Instruments are supplied when needed—cash or credit. U. S. School of Music, 26212 Brunswick Bldg., New York City.

NRA
WE DO OUR PART.

Thirty-fifth Year (Established 1898)

U. S. SCHOOL OF MUSIC.
26212 Brunswick Bldg., New York City

Please send me your free book, "How You Can Master Music In Your Own Home," with inspiring message by Dr. Frank Crane, Free Demonstration Lesson and particulars of your easy payment plans. I am interested in the following course:

Have you instrument?

Name .....

Address .....

City ..... State .....

Mechanical Engineering

Learn at Home

MECHANICAL Engineering embraces the design, construction and operation of machines and machine tools. It is a profession which offers almost unlimited opportunities to men who combine natural mechanical ability with technical training.

For this is The Age of Machinery. Almost every convenience, luxury or necessity which we enjoy depends on machinery for its production or adaptability to our needs. Every new invention multiplies the opportunities for competent designers, builders, erecting engineers, etc.

One of the best ways to train yourself to secure a position as a Mechanical Engineer is through the home-study courses of the International Correspondence Schools.

These courses are complete and up-to-date, and especially arranged to meet the needs of the student who studies at home.

They are particularly helpful because they are written by well-known mechanical engineers with years of practical experience, who know the quickest, best way to solve every problem.

Just mark and mail the coupon and we'll gladly send you Free Booklets describing the I. C. S. courses in Mechanical Engineering or any other course in which you are interested.

INTERNATIONAL CORRESPONDENCE SCHOOLS

Box 2321-U, Scranton, Penna.

Without cost or obligation, send your booklet, "Who Wins and Why," and full particulars about the course *before* which I have marked X:

☐ Mechanical Engineering	☐ Toolmaking
☐ Mechanical Course	☐ Blacksmithing and Forging
☐ Drafting	☐ Patternmaking
☐ Mechanical Drawing	☐ Foundrywork
☐ Complete Shop Practice	☐ Machine Shop Practice
☐ Architect	☐ Plumber and Steam Fitter
☐ Architectural Draftsman	☐ Plumbing Inspector
☐ Building Foreman	☐ Foreman Plumber
☐ Concrete Builder	☐ Heating and Ventilation
☐ Contractor and Builder	☐ Sheet-Metal Worker
☐ Structural Draftsman	☐ Steam Engineer
☐ Structural Engineer	☐ Marine Engineer
☐ Electrical Engineer	☐ Refrigeration Engineer
☐ Electrical Contractor	☐ R. R. Positions
☐ Electric Wiring	☐ Highway Engineer
☐ Electric Lighting	☐ Chemistry ☐ Pharmacy
☐ Electric Car Running	☐ Mining Engineer
☐ Telegraph Engineer	☐ Navigation ☐ Assayer
☐ Telephone Work	☐ Iron and Steel Worker
☐ Civil Engineer	☐ Textile Overseer or Supt.
☐ Surveying and Mapping	☐ Cotton Manufacturing
☐ Bridge Engineer	☐ Woolen Manufacturing
☐ Gas Engine Operating	☐ Agriculture ☐ Fruit Growing
☐ Automobile Work	☐ Poultry Farming
☐ Aviation Engines	☐ Mathematics ☐ Radio

BUSINESS TRAINING COURSES

☐ Business Management	☐ Business Correspondence
☐ Industrial Management	☐ Show Card and Sign Lettering
☐ Personnel Management	☐ Stenography and Typing
☐ Traffic Management	☐ English
☐ Accounting and	☐ Civil Service
☐ C. P. A. Coaching	☐ Railway Mail Clerk
☐ Cost Accounting	☐ Mail Carrier
☐ Bookkeeping	☐ Grade School Subjects
☐ Spanish ☐ French	☐ High School Subjects
☐ Salesmanship	☐ Cartooning
☐ Advertising	☐ Illustrating

Name .....

Address .....

City ..... State .....

Occupation .....

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

MERRY X-MAS

from YOU to Your Workshop

. . . and a Happy New Year from Your WORKSHOP to YOU

Every penny will buy the greatest possible amount of all-year-round happiness and satisfaction if you will make your work-shop a present of an

ATLAS 9" LATHE

$79 COMPLETE AS SHOWN Less Motor

Small Down Payment, then **$6 a month**

Send for free illustrated catalog giving full details of lathe and attachments.

ATLAS PRESS CO.

1852 N. Pitcher St. Kalamazoo, Mich.

REAL JOBS OPEN

For Trained Auto Mechanics

Step into big pay. Earn $35 to $70 a week. I train you in only 8 weeks at largest school of its kind in world. New practical shop plan. Learn with real tools . . . on real equipment. Write quick for Big Free Auto Book and Special Low Tuition offer. No obligation. Add. J. H. McSweeny.

FREE BOOK

McSWEENY SCHOOL, Dept. 11-12
Cleveland, Ohio

DO YOU WANT TO **STOP TOBACCO?**

Banish the craving for tobacco as thousands have. Make yourself free and happy with Tobacco Redeemer. It's a substitute, not habit forming. Write for free booklet telling of injurious effect of tobacco and dependable, easy way to relieve the craving many men have.

Mewell Pharmacal Co.
Dept. 69, St. Louis, Mo.

FREE BOOK

SHOP-KING

For Both Wood & Metal Working

A RUGGED, man-size, *complete* machine that actually costs less than an outfit of small, 3-in-1 machines. Husky band saw, circular saw, disc jointer, lathe with 12-in. swing. One motor with 6-speed quick-shift belt does all jobs.

Write today for literature to SHOP-KING DIVISION, Outboard Motors Corporation, 1242 W. Ruby Ave., Milwaukee.

DESIGNED BY OLE EVINRUDE

AMERICAN BOSCH
AMERICAN TELEVISION
ARCTURUS TUBES
BALKEIT • BRUNSWICK
CAPEHART
CLOUGH-BRENGLE CO.
CROSLEY • CLARION
DeJUR-AMSCO • ECHOPHONE
FADA • GREBE • HOWARD
HAMMERLUND • HICKOK
INTERNATIONAL RESISTANCE
KENNEDY • KOLSTER • LYRIC
MAJESTIC • PHILCO
RADIO PRODUCTS CO.
SANGAMO ELECTRIC
SENTINEL • SHELDON
SILVER-MARSHALL CO.
STEWART RADIO
STEWART-WARNER
STROMBERG-CARLSON
UNIVERSAL MICROPHONE
ZENITH

The need for men, PROPERLY trained, is one of the Radio Industry's major problems, today.

In fact, the very future of the Radio Industry is dependent on the industry having available, at all times, an adequate supply of PROPERLY trained men to install and service — not only the present-day highly complicated Radio and Electronic equipment — but the still more complicated equipment that will be brought out by the industry, from time to time.

The above 30 manufacturers realize this. They know that under such circumstances, no ordinary Radio Training is going to give them the type of "trained" man they want. Only a Training that is right-up-to-the-minute, and properly prepared, highly practical, and properly supervised, will answer their purpose.

Radio and Television Institute home-training has successfully met their every test. That's why these manufacturers recommend R. T. I. Training, not only to their own men, everywhere — but to all men who want to get somewhere in Radio.

* This entire advertisement approved by the above thirty-two manufacturers.

Copyright 1933 by R.T.I.

LET THESE ENGINEERS RIGHT FROM THE HEART OF THE BIG RADIO INDUSTRY *Train You at Home for*

GOOD PAY RADIO WORK

To the man who wants to make $35 to $75 a week and more—*Here's a Message for You!*

"The great Radio Industry, today — more than ever before — is on the lookout for PROPERLY trained men to fill its more responsible jobs. These are the better-paying jobs in Radio . . . jobs which give steady work at good pay, as a starter, and an early advancement to still better-paying jobs, as a future."

HERE, THEN, IS REAL OPPORTUNITY

But to qualify for these better-paying jobs, men must be PROPERLY "trained"—they must know the theory of Radio, as well as the practical side, and be able to teach other men some of the things they know. The Radio Industry, itself, has no time to train these men. That's why the Radio & Television Institute, of Chicago, is doing the job. You'll be trained at home — in your spare time — easily and quickly, and at a cost of only a few cents a day. And as you are taught to "earn as you learn" — R. T. I. Training need cost you nothing.

R.T.I. TRAINING IS "SHOP TRAINING" FOR THE HOME

It comes to you right from the Radio Industry — right out of the factories where Radio sets and other vacuum-tube devices are made. It was planned and prepared for you by big radio engineers IN these factories, most of whom are the Chief Engineers of these great Radio plants. And NOW these same engineers are *actually* supervising R. T. I. Training. Which means that training the R.T.I. way, you'll be trained as the Radio Industry wants you trained — just as the Radio Industry, itself, would train you if it was doing the job.

You learn by doing, of course, because that's the Shop Way of teaching. But you also learn the theory of Radio — without which you can't hope to go far, or make much money, in this great industry.

ELECTRONICS—SOUND PICTURES P. A. SYSTEMS—PHOTO CELLS—TELEVISION—all included

Radio service is just the starting point in R.T.I. Training. From there we take you up through the very latest developments in Radio, and then on into the new and larger field of Electronics—Sound Pictures, Public Address Systems, Photo Cells, and Television. This feature alone makes R. T. I. the outstanding home training in Radio.

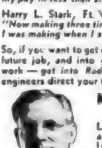
YOU GET "QUICK RESULTS"

C. E. Head, 431 Third St., Alexandria, La., Says: *"Made my first money 73 days after starting your training—cleared $14.25."*

Frank E. Klemann, Lisle, Ill., writes: *"Doubled my pay in less than six months."*

Harry L. Stark, Ft. Wayne, Ind., writes: *"Now making three times as much money as I was making when I started your training."*

So, if you want to get out of a small pay, no-future job, and into good pay, big-future work — *get into Radio.* But let these big engineers direct your training.



MAIL COUPON FOR FREE BOOK

Let me tell you more about this amazingly easy Shop-Type home-training, and more about the wonderful opportunities for the R. T. I. TRAINED man in this world's fastest growing industry. Everything is fully explained in my big, new book . . . "RADIO'S FUTURE, AND YOURS." Send today for your copy. The book is free.

Ray D. Smith, President,
Radio and Television Institute, Chicago

Ray D. Smith, President,
RADIO and TELEVISION INSTITUTE, (R.T.I.),
3130 Lawrence Ave., Dept. 80, Chicago, Ill.
Without obligation of any kind please send me a copy of "Radio's Future and Yours." I am interested in your home training and the opportunities you say exist in the great field of Radio for the R.T.I. Trained man.

Name.....

Address.....

City..... State.....

Midget cars are forever popular. This picture shows an M-M reader, Bill Elmsdorf, with the fine little put-put he built using old Maytag washing machine motor as a power plant. A speed of about fifteen miles an hour is easily reached.

Chips from the EDITOR'S WORKBENCH

Andy expands his columnistic scope and moves in off the tarmac to steam heat, sunshine and a whole new working philosophy.

FRIENDS, I have changed!—But I am still the same Andy. I have moved in for the winter from my long tenanted Robbinsdale hangar home, and am now with the rest of the editors in M-M's own editorial office, where there's steam heat, sunshine and no pesky pig named Parachute to bother.

I wrote a little short, short story I'd like to have run, which explained why this column, while still the same, will change a bit and instead of following my own pet interests, I'm going to try to give that chock-full spindle of good letters and photographs a break and work as many of them into my already limited space as I can.

So for the time being—possibly until next month—I'll have to take ...in checks on the little yarn that shows how this move came about. Meanwhile, let's plunge into the letters with a hey nonny-nonny.

* * *

Every man has to change at some time, or else get in a rut. That's one other reason why I changed the title of this mailbox dept. this month, and feel the better for it. I hope you like it!

* * *

If you want to see a honey of a band saw—and a low priced one at that, by all means write to Jim Tate, Delta Specialty Company, Milwaukee, Wis., and ask him for his new folder on the Delta 14. It is a liberal education in what a band saw can do, what a good one should look like, and it will tell you just how blame cheap one of these high grade tools can be bought for. No orchids here; the tool deserves what I've said.

* * *

With the were-wolf howling on the wasteland, and the glare ice beckoning for conquest, many M-M readers will be building ice-sleds with motors in them this winter. Here's a letter from a chap who has built one:

Polson, Montana.

Dear Andy:

I am sending you a few prints of my ice boat that I constructed last winter. I thought you might be interested in printing one of them if they are suitable.

It is powered with a 61-inch Harley motor which is a little too small for it but did around sixty under the best of conditions. It is constructed of wood covered with muslin and doped. It will seat two people with ample room and comfort. We found it to be very warm inside the cab on the coldest days, which is quite an item in iceboating if you have ever ridden in an open job. The runners are of band saw blade and there are

three of these—two in back and one in front which we steer by.

I believe with a motor such as the Long Harlequin it should get right out with the best of them.

If there are any men that would be interested in getting a set of blueprints I can supply them. These are not full size drawings but easily read. Have them write me.

Yours truly, V. F. Antoine.

Quite a job, Mr. Antoine! And while I'm against running ballyhoo in this column as long as there's such a good pulling medium as M-M's classified ad section, here she is, men. A letter to Mr. Antoine will no doubt bring you further details.

* * *

Remember that swell inside story we ran on the Harmsworth Trophy races last month? Well, before the big race, a small power boat race was held in connection, sponsored by Gar Wood. Model power boat racing is great fun for all who cannot afford bigger boats. Engines? Elmer Wall, 5900 North Fairchild Ave., Chicago, Ill., sends us this photo of a little honey of a 4 cylinder, 4 cycle high speed marine engine for which he will furnish parts. It should shove a metre long hull at a high clip.

* * *

Funny how things develop. We ran a story a few issues back on development of small streams for waterpower. First time it had ever been done. And was I mobbed and beseeched for more data on waterwheels?

A gentleman in Oregon sent me the following letter with a picture of a fine little overshot wheel he built from old Ford Model T gas tanks!

An Oregon reader, Leo Pflaum, built this excellent waterwheel out of Ford gasoline tanks bolted to cultivator wheels!

Snug Comfort for 2 in This Iceboat

V. F. Antoine, of Polson, Montana, built this little Harley powered ice bus. Most all of the thrills of flying, here!

Belford, Ore.

Dear Sir:

I was much interested in that stuff you have been running on water wheels. There doesn't seem to be any other outfit running stuff like that but good old M-M and Carpenter sure knows his stuff.

I have built several wheels to try to get power out of a stream on my place, and none of them works as well as this latest one, which is made of twelve Ford gas tanks bolted to some old cultivator wheels. I'd like to see Mr. Carpenter design a small efficient outfit that could be cheaply built to take power out of a closed pipe line like this, operating on a low head.

I get about 500 watts out of this wheel on an old 32-volt generator, and it supplies enough power for pumping and lights for the house.

Yours truly,

Leo Pflaum.

—to which I may announce that Carpenter has turned out a great little turbine which can easily be hand built by the handy man. Watch later issues!

* * *

You lads interested in amateuring in the ham radio field should write National Radio Institute for their booklet, "Twenty-Eight Tested Ways of Making More Money." As a title it's a long one, and as for ideas, the book is long on those, too. I'm not spilling much about the book, but it's as neat a dish as an eye opener to opportunities as one could find. Don't pass this up!

* * *

Although light plane activity is nearly at a standstill due to Federal regulations which in many states will not allow home-made planes to fly unless they have been engineered and stress analyzed, here's credit to T. L. Kidd, of 519 West Summit Ave., San Antonio, Texas. Mr. Kidd persevered and finished up his Air Camper, anent which he has written the following:

Experimental Station W5LW.

Andy's Workshop:

Have been reading your "column" for a long, long time. In fact ever since I built a Heath Parasol from the dope in M-M several years ago. It got me by the tail and I haven't been able to quit. I've gone without eating,

M-M's Aircamper Design Built by Texan Flies Strongly with 65 H. P.

Although legislation has forced many lightplane builders to abandon hopes, inasmuch as in some states lightplanes are grounded, credit must be given to T. L. Kigel, San Antonio, Tex., for building this version of M-M Pietenpol Air Camper.

sold my car, begged and borrowed but I've always had some kind of a ship since then. The Heath wasn't so good, owing to a very punk Henderson, and lack of experience on my part. Since then I've owned 8 planes, or pieces of planes.

Enclosed are two snapshots of my latest creation. It is a Pietenpol Air Camper with Velie M-5 motor. Does it fly, don't ask! I weigh 185 pounds and it carries me like I was a feather. It is VERY stable and flies hands-off at 1,400 r.p.m. either solo or dual. It has an exceptional climb and slow landing speeds. It is not so fast in the air, top speed being about 90.

Owing to the fact that I had to build this ship in my room here at home I had to build the wing in three sections. Mr. Pietenpol was very kind and obliging to answer the hundreds of questions I had to ask. I worked out four possible arrangements of the wing and sent them to him. He approved the center section type because the wings may be removed without touching the rigging of the center section. Also the gas connections to the tank in the center section do not have to be touched. The wing is a 30-foot span and has square tips, (ah-la Barling NB-3). Otherwise the ship is standard in every way.

Yes, it was built from the 1932 "Manual" and the dope in M-M. In fact, I couldn't have built it without the dope in M-M, as the blue prints of course, can't explain all they show.

I haven't tried any stunts in this ship yet, because I haven't been able to borrow a 'chute. Anyway, why try to tear a ship up? It is safe enough for straight flying and bad landings so why try to outside loop it?

Yours very truly,
T. L. Kigel.

—nice going for Mr. Kigel, eh?

Of course, just because present regulations do not favor flying identified (or unlicensed ships) from licensed fields is no sign that one can't fly his own ship from his own cow pasture as I see it. That accounts for the fine sale enjoyed by all past issues of Flying Manual. By the way, due to this legislation, we do not feel it advisable to put out a Flying Manual for 1934. But we're not asleep. Nor need you be.

You can still build from our excellent plans, still build dream ships around stuff in past Manuals of which we still have a few on hand, and when the government tangle is straightened out as eventually it must, you'll see the finest flock of light plane designs you ever saw—and another Manual!

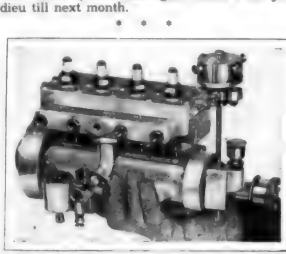
* * *

The short wave midget adapter, which ran in the October issue, was so popular we feel credit should be given the designer, Mr. Thomas A. Blanchard, of 498 No. 9th St., Reading Pa.

* * *

Plans for Tahiti will be concluded in the next issue. And so, with these glad words I bid you adieu till next month.

* * *



Almost two full horsepower is delivered by this little sweetheart of a 4-cylinder 4-cycle gasoline motor. Smooth, she is, too. Our own Elmer Wall, of Chicago, built her. Bore and stroke, one inch! Yes, you can build one too if you wish.

A Sensational New Business

That Can

Sweep You to Riches

Almost Overnight

This is among the first public announcements of what is undoubtedly the most amazing money-making opportunity ever offered to the readers of this—or any other—magazine. It tells how any ambitious, level-headed man can establish—practically overnight—a remarkable new kind of business that can pay a steady net cash profit of $40.00 a day for one-man operation—a business that offers unlimited opportunity—a business that is destined to make many men independently wealthy.

HERE, briefly, are the "high-spots" of this thrilling new business that will create "fortunes" for those with the vision and foresight to get in on the ground floor now:

1 An utterly new product with a natural, staple demand and big repeat business, yet one that has all of the appeal of a novelty.

2 Requires no house-to-house canvassing or selling. You simply manufacture. Stores will sell your entire output.

3 Produces $41.00 a day net profit, selling your entire output at wholesale.

4 A protected product and a protected process. Only our licensees can make or sell. Thus you are protected against cut-throat price competition.

5 Pays steadily; no lean seasons.

6 Big profits to be made in smallest town or largest city.

7 Absolutely no experience needed to be successful.

8 No expensive equipment needed. Your whole investment will be less than your first week's potential income.

This is truth; not fiction—fact; not theory. To the best of our knowledge, no other business in America offers one-tenth the opportunity for profit and independence.

Vision Turned to Reality

A few months ago, this amazing money-making product was nothing more than a dream—the vision of its inventor, Mr. R. H. Newitt of Chicago.

Today, the Newitt-Metzger process is a reality with every detail perfected — complete and tested plans of operation worked out—all necessary equipment ready to turn over to those who are prepared to develop this new "gold mine."

No Selling—No Canvassing

Do not confuse this new product with anything you have ever heard of before. It is not a potato chip, nor candy, nor a cheese chip, nor a paste preparation—but a natural product that comes from the sky, from the ground, and from the air. It is not like anything you ever saw or heard of, or imagined. The simple truth about it is stranger than your wildest dream. And you can be the first to supply this great demand. Your entire output is sold through stores. You do a wholesale business only.

$100.00 a Week, Net, to Start

According to accurate figures, the very minimum of the first operation should produce a net cash profit of at least $100.00 a week. Since it is possible to make $41.00 a day, you can see that it would take only two and a half days of full operation to make a profit of $100.00. This, we figure to be a minimum. We would not be interested in licensing men who could not make at least that much every week. Then, as demand increases, other men can be put to work for you, and you can double, triple, or quadruple your weekly profit as steady repeat business develops.

No Expensive Equipment

Ordinarily a proposition as big as this would require the purchase of expensive equipment with which to manufacture this remarkable new product. But in this case our manufacturing process has been so simplified that we can furnish you with everything you need, start off making a profit the very first day—all for an investment of less than $150.00.

No Experience Needed

Absolutely no experience is required to quickly become successful in this thrilling and fascinating new business. We tell you how to start—how to establish yourself quickly—how to operate the business the very day you are ready to go. We furnish all necessary plans, systems and equipment. Any man with ordinary intelligence and a real desire to succeed is bound to make money.

Small Town or Big City

Another feature that makes this business unlike any other is that it can be operated anywhere. No matter where you live—in the smallest town or the largest city—you can establish yourself practically over night and start enjoying an independent income at once. From the foregoing facts, you can readily see that this is not a business for the timid operator who is satisfied to make a bare living, but for the wideawake, aggressive go-getter who wants to see his energy and enthusiasm produce the greatest possible results in the shortest possible time.

Facts Sent Free

To all such men, we request permission to mail an unusual and complete presentation. After you have read the amazing facts and figures in this presentation, then you can decide whether or not an initial investment of less than $150.00 is too much to ask for a complete business that can pay back that investment in the first four days of operation, and then continue to pay as much as $252.00 a week net profit for single equipment operation, and up to as high as a thousand a week net profit to those men who have the ability to organize and direct other men.

Act Quickly

There is no time to lose. Today this proposition is new. Tomorrow it will be a little older—next week a little older still. So get the facts without a moment's delay. It's the newcomers in any enterprise of this sort—the "ground floor operators"—who always reap the richest rewards.

There is no coupon on this ad. We do not want to hear from coupon clippers. If you don't agree that this is worth a letter—or a telegram—you are not the man for the business.

So write or wire today—without the slightest cost or obligation—and get the information that can make you independent for life.

KING K. CO. Dept. K-2612
54 West Illinois St.
CHICAGO ILLINOIS

Genuine

UNDERWOOD

Below ½ Mfgs. Original PRICE

(Refinished)

Fully Guaranteed

Famous Model No. 5

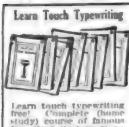
NOW Yours for 10 Days

No Money Down—

Think of it—over 2 million buyers paid $102.50 cash for this model No. 5 now offered direct-to-you at less below ½ original price—and on easiest terms besides. Positively the greatest bargain ever offered. Accept the special 10-day trial offer and be convinced. See the neat, perfect work it does—compare its bright, shiny newness without risk. Recognized as the *finest, strongest* typewriter built.

Easy Terms—only 10c a day

Here is positively the chance of a lifetime to own a World-famous Standard Underwood No. 5 completely refinished at the very lowest price and easiest terms. All complete with modern improvements, including standard 4-row keyboard, back spacer, automatic ribbon reverse, shift lock, 2-color ribbon, etc. Ideal for business and professional men, teachers, students, story writers, etc. Don't let this chance pass by.



Learn touch typewriting free! Complete (home study) course of famous Van Sant system given with this offer. Fully illustrated—easily learned.

10 Day Trial

You save over $60 by quick action. These genuine guaranteed Underwood, now only $39.90 (cash) while limited supply lasts. **Send no money.** The Underwood is yours for 10 days' trial. If you keep it—only 10c a day more buys for your Underwood at our new low price and easiest terms. Send at once before this special offer is withdrawn. Remember every machine fully guaranteed and sent on 10 day trial.

International Typewriter Exchange
231 W. Monroe St., Chicago, Dept. 1205

Send Underwood No. 5 (F. O. B. Chicago) at once for 10 days' trial. If I am not perfectly satisfied I can return it express collect. If I keep it I will pay $3 a month until I have paid $44.90 (term price) in full

Name ..... Age .....

Address .....

Town ..... State .....

Trapped! by the LAW

Each month the big stories of crime detection, cases in which scientific police work is used to triumph over the forces of the underworld, are published in

STARTLING Detective ADVENTURES

Every one of these smashing true stories of detective work shows up the fallacy of crime—the fact that law and order win in the end—that CRIME DOES NOT PAY!

LOOK FOR THIS COVER

If your news dealer cannot supply you, send 15c to STARTLING DETECTIVE ADVENTURES, 529 S. 7th St., Minneapolis, Minn., and a copy of the December issue will be mailed to you.

Now on Sale—15c

Never Seen Equal

"Logged several Central American and Mexican stations; short and long wave. Get FYA, France. Never seen anything to equal this new Midwest-16."—T. N. Stewart, Vero Beach, Florida.

Fine Results

"I am well pleased with the Midwest-16. Sunday afternoon we were listening to a Rugby game between Ireland and England, being broadcast from London."—B. J. Hart, 41 West St., Cromwell, Conn.

No Other Set Compares

"The Midwest 16-Tube Radio is all you said and more (a world-wide receiver). I don't believe there is another set with tone and selectivity of a Midwest 16."—C. L. Gietl, 415 E. S. Grand Ave., [illegible]

THOUSANDS ARE *Enthusing* OVER THIS

Amazing New SUPER *Deluxe* 16-Tube ALL-WAVE Radio

9 TO 2,000 METERS

30 DAYS FREE TRIAL

WORLD-WIDE RECEPTION!

MIDWEST startles radio world by offering this 16-tube De luxe ALL-WAVE radio... finest development of its 14 years of experience as leading radio manufacturer... at sensationally low price of only $49.50. Buy this bigger, better, more powerful, clearer-toned radio... direct from Midwest Laboratories... at a positive saving of 30% to 50%. Brings in broadcasts from stations 10,000 miles and more away. Complete wave lengths—9 to 2,000 meter (33 megocycles to 150 KC).

This powerful, super-selective, radio has FIVE distinct wave bands... ultra short, medium, broadcast and long... putting whole world of radio at your finger tips. Now listen in on all U. S. programs... Canadian, police, amateur, commercial, airplane and ship broadcasts...and world's finest stations as: DFA, Nauen, Germany—REN, Moscow, Russia—EAQ, Madrid, Spain—12RO, Rome, Italy—VK2ME, Sydney, Australia. Never before so much radio for so little money. Don't buy any radio until you learn about this greatest of radio values. Send for money-saving facts.

TERMS AS LOW AS $5.00 DOWN

WORLD'S GREATEST RADIO VALUE

$49.50 with New *Deluxe Auditorium Type* SPEAKER

We will send you copies of letters like those shown at top of page. They'll convince you that Midwest radios are sensational values! They prove you can order a Midwest radio by mail with as much satisfaction as if you were to select it in our great laboratories.

New Style Consoles

The new, big Midwest catalog shows a complete line of beautiful artistic, deluxe consoles... in the new modernistic designs... and priced to save 30% to 50%. Hand made by Master Craftsmen, they lend distinction and dignity to any home. Mail coupon today.

40 NEW 1934 FEATURES

Try this Midwest radio... in your own home.... for thirty days before you decide. See for yourself the 40 new 1934 features that insure amazing performance. For example—Automatic SELECT-O-BAND (exclusive with Midwest), simplifies short wave tuning, instantly pointing out the wave length of the station. Other features include: Amplified Automatic Volume Control, New Type Tubes, 16 Tubes, Balanced Unit Superheterodyne Circuit, Velvety Action Tuning, Super Power Class "A" Amplifier, 29 Tuned Circuits, New Duplex-Diode-High Mu Pentode Tubes, No-Image Heterodynes, Full Rubber Floated Chassis, Variable Tone Blender, Centralized Tuning, 7 KC Selectivity, New Thermionic Rectifier, Totally scientific shielded (coils and switch catacombed), etc. These features are usually found only in sets selling from $100 to $150.

DEAL DIRECT WITH LABORATORIES!

Increasing costs are sure to result in higher radio prices soon. Buy before the big advance... NOW! while you can take advantage of Midwest's amazingly low prices. No middlemen's profits to pay! You save from 30% to 50% when you buy direct from Midwest Laboratories—you get 30 days FREE trial—as little as $5.00 down puts a Midwest radio in your home. Satisfaction guaranteed or money back! FREE catalog shows sensational radio values. Write TODAY!

SAVE UP TO 50%

NRA

Sign and mail coupon... or, send name and address on postal card... NOW!

RUSH THIS COUPON FOR AMAZING 30-DAY FREE TRIAL OFFER AND NEW 1934 CATALOG

Midwest Radio Corp.,
Dept. 343
Cincinnati, Ohio

Without obligation on my part send me your new 1934 catalog, and complete details of your liberal 30-day FREE trial offer. This is NOT an order.

AGENTS! ● Make Easy Extra Money
Check Here for Details ☐

Name.....

Address.....

City..... State.....

MIDWEST RADIO CORP.

DEPT. 343 — CINCINNATI, OHIO, U. S. A.

Established 1920 Cable Address Miraco ABC 5th Edition

Solar Telescope—$1.25

NEARLY 3 FEET LONG

The new Excelsior Solar Telescope is a large and serviceable instrument, nicely made and accurately fitted. When extended it is almost three feet in length, and when closed measures not quite twelve inches in length. Telescopes of this size usually sell for many times this price, but by importing them direct from a large European manufacturer, we are enabled to offer them to our customers for ONLY $1.25 each, at which price they ought to sell readily. The lenses are well made, the sides are brass bound, and the four sections are perfectly fitted. Here is your chance to obtain a Telescope for a nominal sum. It will be sent postpaid to any address upon receipt of $1.25 in any convenient form. Postage stamps accepted if more convenient. *770 page Catalog of novelties, tricks, jokes, etc., 10c.*

MAKE YOUR OWN RADIO

Enjoy the thrills of radio, make, for months, latest new, inexpensive, unpatented SET. Complete

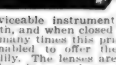
RADIO SETS" shows how to build and operate inexpensive Radio Sets, the most popular types. Many illustrations and diagrams make this book a guide and short-cut. Receiver for bringing in foreign stations, police calls, plays or airs, etc. ONLY 10c p.p.d.

250 MAGIC TRICKS

An envelope trick book containing nearly 300 tricks for parlor or stage that anyone can do. Tricks with cards, coins, handkerchiefs, cups, bottles, etc. Also Second Sight, Shadowgraphy, etc. Profusely illustrated. 90c postpaid.

125 CARD TRICKS and sleight of hand. Contains 125 tricks with cards and tricks explained by self-working diagrams, with explanations of card tricks used by professional magicians. **Price 25c postpaid.** Coin or stamps.

SILENT DEFENDER



Used by police officers, detectives, sheriffs, night watchmen and others as a means of self-protection. Very effective. Easily fits the hand, the fingers being grasped in the four holes. Very useful in an emergency. Made of aluminum they are very light, weighing less than ounces.

Handy pocket size—always ready for instant use. **Price 25c ea., 2 for 45c postpaid.** *770 page Catalog 10c*

MIDGET BIBLE

"GREAT CURIOSITY Exhibited in the World, size of type used in the 250 Pages. Bind to hang or look in the corner. A genuine work of art to be seen to be appreciated. 30 new guest money getting stunts, clever entertainers. Size 1¾x2¾ inches. Price, each, $1.25, 100 for $7.50. Leather Bound, with thumb index, each, 3 for $1.25, $4.50 per doz. Magnifying Glass for use with 31-dot Bible 10c

SURPRISE MATCHES

More fun than fighting with your wife. Look just like ordinary matches. As the victim tries to light one he gets quite a surprise. 10c

Price 10c per box, 3 boxes for 25c. 12 for 75 cents.

LOOK 35¢ LOOK Wonderful Instrument.

Greatest value ever offered. Nine Instruments articles in one. Everybody delighted with it. Odd, Curious and Interesting. Lots of pleasure as well as very useful. It is a double Microscope for examining the wonders of nature. It is also an Opera Glass, a Stereoscope, a Burning Lens, a Reading Glass, a Telescope, a Compass, a pocket Mirror, and a Laryngoscope—for examining eye, ear, nose and throat. It is worth all the cost to locate even one particle under the eye. Folds flat and fits the pocket. Something great—you need one. Don't miss it. Sent by mail, **Only 35c or 3 for $1.00.**

SERPENT'S EGGS

Set contains 13 eggs. When lit with a match, they gradually become lined into a coiled serpent of fast-rising, white ash and when finished is a most startling novelty. **Price per set, 10c postpaid. 3 for 25c**

STAR TOY MAKER

"STRANGE BOYS" book written Tells how to make Electric Motor, Telephone, Microphone, Telegraph, Boomerang, Telescope, Periscope, Kite, Talking Machine, Microscope, Electric Motor, Electric Door Bell, Water Wheel, Pop Gun, Sling Shot, Burglar Alarm, Toy Engine, Rubber Band Gun, Dog Sled, Bird House, Rabbit Yard, etc. 150 illustrations. **Price 25c postpaid.**

ELECTRIC MOTOR

All Parts Necessary for Only 10c Runs on No. 6 Dry Battery

An Electric Motor for Only 10 cents. Sounds almost unbelievable, but it is true. For ONLY 10 cents we will send you all the necessary parts and in a neat box with full printed and illustrated instructions for assembling. It is possible for any boy to put this together in a few hours. Full instructions how simply to put it together. Only a few minutes required. Price, postpaid, 10c

BOOK ON BOATS.

How to build rowing, sailing boats. Everything pertaining to boats explained in plain terms so anyone can understand. Illustrated. **Price 25c postpaid.**

STAGE MONEY

Withabunch of these bills, it is easy for each person of limited means to appear prosperous by flashing a roll of them. At the time and peeling off a genuine bill or two from the outside of the roll, the effect created will be found to be all that can be desired. **Price, postpaid: 40 Bills 20c, 120 for 50c or $3.50 thousand postpaid.**

20 MINUTE HARMONICA COURSE.

Are you witnessing talent leaving you poor, or are you musically inclined? **Price 10c postpaid.**

MONEY MAKING SECRETS.

Tells how copper vanishes by everyone. 64 page copyrighted book. Tells how to make money with secret formulas, working stunts, money getting secrets of successful men, etc. Many valuable secrets. **Price 25c postpaid.**

TRICKS & SOCIAL ENTERTAINER.

Contains hundreds of tricks, stunts, games, pastimes that anyone can do. Also contains 64 musical selections. **Price 25c postpaid.**

WONDERFUL X-RAY TUBE

A wonderful little instrument producing optical illusions which are surprising and startling. With it you can see what is apparently the bones of your hand, then a hand covered with hair coming in a pipe rack, and many other similar illusions. **Price 10c, 2 for 15c postpaid.**

Tell Your Own Fortune

With the aid of this dream book and fortune teller. The key to your future is quickly learned. Complete with fortune teller, bio-graph. Will tell you the wedding day of the one you love, by marks, stars or moles, mysterious prince with cards, lucky days, weeks' monthly years; how to receive oracles by dreams, signal observations, etc. **PRICE 10c**

LEARN to Hypnotize

This remarkable book entitled "How to Hypnotize" Explains a great Hindu system of hypnotism, how to hypnotize, how to produce sleep, how to awaken a subject, how to hypnotize animals, hypnotism at a distance, hypnotism by telephone, hypnotism by mail, practice, illusions and delusions, personal magnetism, thought transference, mesmerism in plain, simple language that anybody can understand. **PRICE 10c postpaid.**

NOSE FLUTE

Fool Your Friends 10c

The Magic Nose Flute is a musical instrument, is a unique and novel instrument that is played with nose and mouth combined. Simply put the little hand in playing in which you desire and adjust after a little practice, the most wonderful melodies you ever heard can be produced. Full instructions and One piece have mastered it you can play all the popular airs of the day. Send at once.

JOHNSON SMITH & CO. Dept. 937 RACINE, WIS.

FORTUNE TELLING BY CARDS

Book shows how to tell fortune with cards, dice, dominoes, crystal, etc. Tells the meaning and significance of every card. Several different methods explained and fully illustrated. Crammed full from cover to cover with complete information on fortune-telling. **PRICE 10c postpaid.** *Stamps accepted.*

LATEST CATALOG

JOHNSON SMITH & CO.

Dept. 937 RACINE, WIS.

A copy of our NEW CATALOG mailed on receipt of 10c, or the Dec. Issue Catalog—same size and cloth binding 25c. Largest and most complete book of its kind in existence. Nearly 900 pages of all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps, for all articles listed above. Canadian money, stamps and Postal Notes accepted at current rate of exchange.

Address orders for all goods on above and on following page to Johnson Smith & Co., Dept. 919, Racine, Wis.

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

BAG O' TRICKS 15c

15c

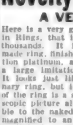
It is great fun mystifying your friends. Get this Bag O' Tricks and be the cleverest fellow in your district. Contains apparatus and directions for **FOUR FIRST CLASS TRICKS,** including the MAGIC PADDLE (mystify your friends by making the magic stick jump from one hole to the other), the TANTALIZING CROSS TRICK, HINDU MYSTIC SQUARE TRICK, and the MYSTERIOUS RATTLING CLOCK TRICK.

Full instructions with each trick. No skill required. Everything complete for

15c **postpaid.** *770 page Novelty Catalog 10c.*

Novelty French Photo Ring

A VERY GREAT CURIOSITY



Here is a very great novelty in rings, that is selling in thousands. It is a nicely made ring, finished in imitation platinum, and set with a large imitation diamond. It looks just like an ordinary ring, but in the shank of the ring is a small microscopic picture almost invisible to the naked eye, yet is magnified to an almost incredible degree and with astonishing clearness. There is quite an assortment of pictures that should suit all tastes. Some are pictures of bathing girl beauties, pretty French Actresses, etc., others are views of places of interest in France, Panama Canal and elsewhere; others show the Lord's Prayer in type, every word of which can be read by persons with normal eyesight. They are interesting without being in any way objectionable. **PRICE 25c. 3 for 65c. or $2.25 per doz. postpaid.** *770 page Catalog 10c.*

Crystal Radio Receiver, $1.00

Say what you will about Electrical and Battery Sets, a CRYSTAL set has them all beat for simplicity and cleanness of tone. There is absolutely no noise and no disturbance—no batteries to buy—no failures to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Receptive is loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal Set you can buy. Has a receiving radius of 25 miles. Comes complete with head phones and 100 feet aerial wire. Consisting of the finest materials throughout, including a sensitive crystal detector, variable condenser and inductance coil, all enamelled and ready to use. Everything all complete and ready to receive signals. Nothing else to buy. **$2.95 postpaid. JOHNSON SMITH & CO., Dept. 919, RACINE, WIS.**

Electric Telegraph Set 15c

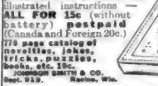
BOYS! A private Electric Telegraph Set of your own for **15c.** Lots of fun sending messages to your friends. Better still get two sets, hook them up as shown in the directions, for TWO-WAY MESSAGES (sending and receiving). No trouble at all to operate with the simple instructions that accompany each set. Operates on any standard dry battery obtainable everywhere. With this outfit you can learn to transmit and receive messages by the Morse International Code, and in a very short time become an expert operator. Mounted on wooden base measuring 4 x 3 in., first-class construction throughout, complete with key, sounder, magnet, miniature Western Union blanks, packed in neat box with full illustrated instructions — **ALL FOR 15c** (without battery) **postpaid** (Canada and Foreign 20c.)

The Boy Electrician 10c

Add 10c for 64 page book of instructions, with many novel experiments for boys. With how to make batteries, dynamo, electric motor, telegraph apparatus, electric bells, alarms, telephone, etc. **PRICE 10c postpaid.**

770 page catalog of novelties, jokes, tricks, puzzles, books, etc. 10c.

JOHNSON SMITH & CO. Dept. 919, Racine, Wis.



NEW VAMPING CARD

NO TEACHER NEEDED—SURPRISINGLY SIMPLE SYSTEM

Persons hating neglected their Musical Education need not despair, for with the aid of our new VAMPING CARD (during the card upright on the piano keys), you can Vamp away to thousands of Songs, Ballads, Waltzes, Rag Time, etc., etc. No knowledge of music is required. After using it a few times, you will be able to dispense with the aid of the Vamping Card entirely. The price of this very clever invention is **only 15c postpaid.**

SEX INDICATOR

An amusing and entertaining novelty. Hold it over a woman's hand and it is supposed to describe a reminder and ominous circle. Hold it over a man's hand and watch it move back and forth like a pendulum. We have made innumerable tests, and while we have never been able to figure out how it's done, we have never seen it fail. Many novel and interesting experiments may be performed with it. Try it for testing the sex of animals, cats, dogs, rabbits, butterflies, etc. Sold as a patent egg tester in Europe. **PRICE 25c. 3 for 65c.**

BLANK CARTRIDGE PISTOL

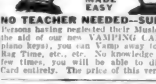
Prices 50c $1.00

Protection against Butglers, Tramps and Dogs

Well made and effecting; modeled on latest type of Revolver, appearance alone is enough to scare a burglar. When loaded it may be as effective as a real revolver without danger to life. Takes Blank Cartridges obtainable everywhere. **Price 50c. Souvenir quality, $1.00. Blank Cartridges, 50c per 100. Holster (Genuine Leather) for Blank Cartridge Pistol, 50c.** Shipped by Express only.

Shipped by Express only. Not prepaid.

BIG ENTERTAINER



180 Jokes and Riddles, 24 Magic Tricks, 54 Parlor Games, 73 Toasts, 15 Card Tricks, 12 Fairy Tales, 50 Money-making Secrets, 10 Funny Readings, 3 Monologues, 21 Puzzles, 10 Problems, 5 Comic Recitations, cut-outs for Checkers and Chess, Dominoes, Fox and Geese, 9 Men Morris, Spanish Prison Puzzle, Game of Anagrams, etc. etc. for **15c postpaid.** *770 page Catalog of novelties, jokes, tricks, etc., 10c.*

BOYS! THROW YOUR VOICE

Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

THE VENTRILO

a little instrument, fits in the mouth out of sight, used with above for Bird Calls, etc. Anyone can use it. **Never fails. A 16 page course on Ventriloquism and the Ventrilo. All for 10 cents postpaid. JOHNSON SMITH & CO., Dept. 919, RACINE, WIS.**

JOHNSON SMITH & CO.

Dept. 919, RACINE, WIS.

A copy of our **NEW CATALOG** mailed on receipt of 10c., or the 10c. Let's Have Fun Outfit (with Catalog) 25c. Biggest novelty catalog published. Nearly 800 pages of all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in goods and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps, for all articles listed above. Canadian money, stamps and Postal Notes accepted at current rate of Exchange.

CLASSIFIED ADVERTISEMENTS

Rates for classified ads, 10c per word per insertion. Minimum 10 words. Cash should accompany order. Closing date first of second month preceding date of issue. Address Classified Mgr., Modern Mechanix and Inventions, 529 7th St. South, Minneapolis, Minn.

AGENTS

FREE literature describing many money-making plans. D-Bellert, 4042 N. Keeler, Chicago.

MAKE MONEY. Collect $6, keep $5. Two quick selling dollar per month "hard times" life-policies. Great Northern Estate Corporation, Department C, Rockford, Illinois.

TEA and COFFEE route men—big reliable national company needs more men immediately. Previous experience unnecessary, but must be honorably able and willing to service 200 steady consumers on regular route and work 8 hours a day for about $27.50 weekly. Write Albert Mills, Route Mgr., 3948 Monmouth, Cincinnati, O.

AGENTS WANTED

CASH income daily reslivering mirrors at home. Replating autolight reflectors, tableware, etc., outfit furnished. Write Sprinkle Plater, 850 Marion, Indiana.

POLISHING cloth removes tarnish from metals, without use of liquids. Sample and sales plan 10c. Raymond Schwagling, South Amana, Iowa.

MUSICIANS sell new piano tuning outfit including method $4.50. Cost prepaid $3.00. Colgan Products, 1855 Calvert, Washington, D. C.

BIG MONEY and Fast Sales. Every owner buys Gold Initials for his auto. You charge $1.50; make $1.45. Ten orders daily easy. Write for particulars and free sample. American Monogram Company, Dept. 11, East Orange, New Jersey.

AGENTS: Make 600% profit selling cleaner, polish, shampoo, vanilla, tonic laxative, spot remover, etc. Your name on labels. Free sample. Standard Chemical, Dept. P-111, Dayton, Ohio.

AGENTS. Smash go prices. Santos Coffee 12c lb. 4-oz. Vanilla 81c, $1.00 size Tooth Paste 39c. Razor Blades 3 for 10c. 100 Sticks Chewing Gum 12c. Christmas Cards, 21 in box, 14c. 150 other bargains. Experience unnecessary. Write, Carnation Co., MN, St. Louis, Missouri.

LIQUID MENDER—Repairs metal, wood, crockery without heat. Sells 25c. Costs 6½c. Sample and work FREE. Bestco., 5005-W Irving Park, Chicago.

MAKE more money selling shirts, ties, underwear, dresses, hosiery, raincoats, leathercoats, sweaters, coveralls, uniforms. Outfit free. Nimrod Company, Department 132, 4922-28 Lincoln Avenue, Chicago.

GOOD income plating auto parts, reflectors, mirrors by new method. Outfits furnished; free particulars. Gunmetal Co., Ave. A, Decatur, Ill.

BIG MONEY for you. Make, sell, printing cuts. Tremendous market. New, amazingly easy process. Learn quickly, cheaply. Specimens Free. Hughes Products, 23 Miami Avenue, Terrace Park, Ohio.

MAKE PRODUCTS yourself. Tested formulas. Catalog free. Grinstead Laboratory, Edwardsville, Illinois.

MEN or Women! Look after local Coffee and Tea Route. Call on homes with 300 highest quality necessities. Spare or full time. No investment. Permanent. Good starting pay. Rapid promotion. Blair Laboratories, Dept. T-3, Lynchburg, Va.

BIG MONEY applying gold metals on automobiles. Easiest thing today. No experience needed. Free samples. "Ralco," 1004 Washington, Boston, Mass.

MAKE Your own products. Employ agents your-self. Toilet articles, soap, extracts. We furnish everything. Valuable book free. National Scientific Laboratories, 1964 W. Broad, Richmond, Virginia.

AGENTS! Gold Sign Letters for store windows. 500% profit. Free sample. Metallic Letter Co., 426 N. Clark, Chicago.

ADVERTISING AGENCIES

ADVERTISE: 24 words in 250 newspapers $10. Lists Free. Advertising Service Bureau, 4650 Drexel, Chicago.

AVIATION

ARMY Air Corps gives one year free flying course, 250 hours solo flying, salary while learning. Send 20c for information booklet telling how to qualify and apply. Federal Equipment Co., Deerpark, Ohio.

ENGINEERING Service for Small Builders. Stress analysis, airfoil layouts, ribs, wings, fuselages to order. Send dime for complete list and service plans. AERO 3242 South Springfield Ave., Chicago, Ill.

SPECIAL sale on fifty SB propellers all sizes, prices from $14.00. Send dime for very latest list. Department M.M. Sensenich Bros., Lititz, Penna.

PROPELLERS for Airplanes, Ice or Speed Boats. Guaranteed performance at low cost. Order now to avoid big rush. Circular 3c stamp. Lorenzen Propellers, Chehalis, Wash.

METAL tipped propellers; Fords, $9.98; Henderson, $8.98; Harley, untipped, $4.50; Super Heath Ships, a steal at $190.00; Bristol Scout Type 40 H. P. motors, $98.00. Photos, information including leather bound flying manual, 25c. Hollis, Ft. Worth, Texas.

USED Airplanes $85 and up. Catalog 10c. Federal Equipment, Deerpark, Ohio.

EXAMINATION questions for pilot's or mechanic's licenses with answers, $1, or write for details. Milan Aeronautical Institute, Milan, Indiana.

SNOW and ice sled parts, also motor conversions at low prices. Write us your needs. Lorenzen Propeller Co., Niles, Mich.

AVIATION—young men interested in entering aviation as apprentices. Write, enclosing stamp, to Mechanics-Universal Aviation Service, Hotel Detroiter, Detroit, Mich.

AVIATION-propellers for boats, sleds and planes. Blueprints for shallow water boats, 75c. Blueprints of complete drive unit for Harley motors, $1.25. The J. B. S. Propeller, Lititz, Pa.

A. C. AUTO GENERATOR

CONVERT Ford generator into 110-volt, 250-watt, dependable A. C. generator. Driven by fan belt on car. Adaptable for public address, radios, anyhome, camp or flood lighting. Simple instructions with complete drawing. Only $1. Autopower, 412 So. Hoyne Chicago.

AUTO REPAIRS

BRAKES DRILLED, lining and special tools: Ford, Plymouth, Chevrolet. Four wheels three dollars. Clifton Guilden Street, New Brunswick, New Jersey.

BUSINESS OPPORTUNITIES

$$$ $40,000—I made it. Plan 10. "MooreMade," Lapeer, Mich.

QUICK MONEY—Made with Tesla Plan. It Works. 25c. Jones 668, Hansard St., Akron, Ohio.

THE PLASTEX Industry needs manufacturers on small scale and for big production of Art Goods, Novelties, Souvenirs, etc. in Plastex and Marble imitation. Experience unnecessary. 2c material make. 25c articles. Rubber molds furnished for speed production. We place orders and buy goods. Small investment, large returns. Interesting booklet mailed free. Plastex Industries, Dept. R, 1085 Washington Ave., New York.

WISE MEN Get Money Easy! Plan 10c. "Mooremade," Lapeer, Mich.

OPERATE Chain of vending amusement machines. Be independent. Get Rich. Start small, grow big. Goodbody, 1826 East Main St., Rochester, N. Y.

PREPARE for prosperity—our twenty week electrical engineering correspondence course attracting worldwide attention—Basic electrical, radio, publicaddress, practical electric theory covered. Experimental laboratory apparatus free with course—Attractive tuition rates—Delayed payment plan for jobless men —Write today for Engineering School, 455-L South 37th St., Lincoln, Nebraska.

BIG MONEY making secrets start your own big paying business. Worth 1000 times its cost. Illinois Universal, 800 M. N. Central, Chicago.

SELL by Mail. Books, Novelties. Bargains! Large Profits. Particulars free. H. Elfco, 528-S Dearborn, Chicago.

MEN—WOMEN interested earning money home, write for details. Elbet, F 277 Broadway, New York.

TATTOOING Outfits, Supplies—Catalogue. Guaranteed Remover. "Waters," 965 Chestnut, Detroit.

AMATEUR cartoonists, earn $25.00 week, spare time, copying cartoons for advertisers. Three-M Syndicate, Argyle, Wis.

LIQUID MARBLE — Anyone can make! Applied with brush or molded. Rubberlastic molds; liquid porcelain; composition flooring. Big money making these! Particulars free. Rapid service, Edwardsville, Illinois.

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

BUSINESS OPPORTUNITIES

LEARN Marbleizing: With our snow white Marble Dust Composition. Brushed on anything or poured into molds. Resembles polished marble. Sanitary floors for all uses. Formulas for Celluloid, Rubberite and plastic molds. Celluloid lasts indefinitely, produces highest glossy finish. For novelties, plaques, etc. Dime brings illustrated literature, rubberite, marbleized samples. Cowell Institute, Grayling, Michigan.

LEARN Fountain Pen Repairing. Thousands needing repairs daily. Big profits. Illustrated course teaches anyone in few weeks. Inexpensive to start. Complete course $1.00. Universal Co., 213 North Lafayette, Mobile, Alabama.

100 DIMES daily, fine spare time business, guaranteed plan 10c. Coin. Legitimate. Midwest Agency, 312 So. Eighth St., Minneapolis, Minn.

DUX BAX brings you bucks back. You make it, costs you two cents, sells for two bits, every motorist buys. Magic fluid starts wet auto motors instantly, no matter how wet. Startling demonstration sure sells itself. Complete kit obtainable anywhere. Send dollar for directions, your money promptly refunded if you are not fully satisfied. Dux-Bax Products, Paris, Ark.

WILL FINANCE manufacturing or market specialties, novelties of merit, national distribution basis. Retail 10c-$1.00. Full details or submit samples. Write U. S. Display, 277 Broadway, New York.

MANUFACTURE—Sell your own beverages, extracts, candies, soaps, perfumes, etc. Free booklet. Truway Laboratories, 1623 W. Grand, Chicago.

STUFFED with your own products. Make-sell them. Formulas, processes. Analytical Service. Formula catalog free. Thaxly Co., Washington, D. C.

PROFITS quick, enormous; no soliciting. Men, women, get facts. McArthur Co., Desk 19, Butte, Montana.

SELL used radios to farmers, 8,000,000 prospects. Standard brands $3.00 up. List 10c. Acme, 20027 Lichfield, Detroit.

SMALL mail order dealers who get poor results can learn from successful without the usual mail order losses. Stamped envelope required. John H. Lundy, 1000 Bell Bldg., San Bernardino, California.

MAKE products yourself—tested formulas. Catalog free! Grinstead Laboratory, Dept. 2, Danville, Illinois.

NEED MONEY? Free 36-page book tells how. Novex, Box 1961-X, Birmingham, Ala.

COMPLETE Chemical Service. Analyses. Formulas, Consultations. State Licensed Chemist. Twenty-five years' experience. Write for literature. W. L. Cummings, Ph.D., 428 Gordon Avenue, Syracuse, N. Y.

BOATS

SIMPLE Blueprints: 12' rowboat, 30c; 16' outboard utility, 50c. Steward, 2541 Enid 19 Street, Brooklyn, N. Y.

BUILDING PLANS

THE WIND is free why not use it? You can build your own wind driven electric plant. Building plans dollar bill. Perfect plans. Louis Klingsick and Sons, Optima, Okla.

CAMERA and PHOTO SUPPLIES

MAKE Money in Photography. Learn quickly at home. Spare or full time. New plan. Nothing like it. Experience unnecessary. American School of Photography, Dept. 2047, 3601 Michigan Avenue, Chicago.

CAMERAS

FREE! Our new bulletin! Telling you how to make money with your camera and how to develop and print your own pictures. Thousands are deriving substantial incomes in this pleasant manner. Send for your free copy and find out how. Central Camera Co., 230 South Wabash Ave., Dept. M.ME-126, Chicago, Ill.

CARNIVAL GAMES

MAKE you money—Outfits supplied, catalog 10c. "Mooremade", LaPeer, Michigan.

CHARTERS

DELAWARE Charters; fees small; free forms. C. Grant Guyer, 901 Market St., Wilmington, Del.

DETECTIVES

DETECTIVES. Earn Big Money. Excellent opportunity. Experience unnecessary. Particulars free. Write, George Wagner, 2640-V Broadway, N. Y.

BE A Detective. Make secret investigations. Experience unnecessary. Write United Detective System, 1623 W. Grand, Chicago.

DUPLICATORS

DUPLICATING Machines $3.85 to $95. Rotary Stencil, Clay Composition, Gelatin Film. Most Complete Line in America. Duplicator, Folder Free. Pittsburgh Typewriter Supply, Suite 551, Pittsburgh, Pa.

STENCIL DUPLICATOR—Anyone can make. Particulars free. Rapid Service, Edwardsville, Illinois.

EDUCATION TRAINING

WANTED—Names of men desiring steady outdoor jobs; $1700-$2400 year; vacation; short hours; protect game. Write immediately. Delmar Institute, B-32, Denver, Colorado.

EXPERIMENTERS

FASCINATING scientific novelty; chemists booklet and scientific catalog, all 5c. Laboratory, M-5049 Bernard Chicago.

FALLING HAIR

BALD? Hair falling? Let "Hair-Health" regrow your hair. Sample 10c. Healtheo, Box 255, Shamokin, Penna.

FILMS

NEW 35MM film spools, your choice, 100 or 400 ft. sizes, two for 45c. GRN Films, 3 Lochwan Ave., Worcester, Mass.

ELECTRICAL EXPERIMENTS

EDUCATIONAL, Entertaining, Electrical laboratory experimental kits, sixteen valuable pieces, $4.89. Seven piece kits, $1.77. Hand driven A.C. generators, 91c. Microphones, 44c. Detectophone kits, $1.74, etc. Instructions with all. No toys (Western Electric, Kellogg, Stromberg-Carlson salvage equipment). Jewell surplus bargain bulletin, stamp. Engineering Service Company, 3724 'A' Street, Lincoln, Nebraska.

FINGERPRINTS

FINGERPRINT experts required; various branches; government; large corporations; particulars free. American System, 2640-Y Broadway, N. Y.

WANTED Finger Print Experts, write S. Silvers 4358 South Keatine, Chicago, Illinois.

FORMULAS

FORMULAS—all kinds. Guaranteed. Catalog free. "Kemico", B-16, Parkridge, Ill.

SUCCEED with your own products. Make-sell them. Formulas, processes. Analytical Service. Formula catalog free. A. Thaxly Co., Washington, D. C.

MAKE and SELL your own products. Ten secret formulas $1.00. Peter Von Lamm Sales, 2202 E. Mkt. St., New Albany, Ind.

MANUFACTURE. 30 formulas for 25c. Raymond Schwarting, South Amana, Ia.

FORMULAS—Interesting Literature Free. D-Belfort, 4042 N. Keeler, Chicago.

TESTED FORMULAS—newest, guaranteed. Catalog free! Grinstead Laboratory, Riverside Terrace, Illinois.

MAGIC fluid keeps ice off windshields. Make, sell solution. Formula 25c. Mohri, Rushville, Indiana.

FOR INVENTORS

MANUFACTURERS now showing increased interest in sound inventions, patented or unpatented. What have you? Write Chartered Institute, 521 Barrister Building, Washington, D. C.

FROG RAISING

RAISE FROGS—(Spare Time!)—Pair Breeders lay 10,000 eggs. Bullfrogs sell $1.00-$4.00 dozen. Huge profit. Unlimited market. Interesting book "Fortune in Frogs," free. American Frog Canning Company. (119). New Orleans, Louisiana.

HELP WANTED—INSTRUCTION

WANTED, Men-Boys, age 18-50, qualify for steady future Government Jobs; commence $105-$175 month. Valuable information Free. Write, Instruction Bureau, 234 St. Louis, Mo., today.

HYPNOTISM

HYPNOTIZE! 100 Method Course, $1. Dr. M. Lonk, (Hypnotist), Palatine, Illinois.

JEWELRY

LEARN Watchmaking. Beginners' tools, practice movement, instruction file. Watch and clock tag. Complete lists 5c. Stewart Watch Co., Carleton Building, St. Louis, Mo.

JIG SAW

STURDY Jig Saw—anyone can operate by foot. Easily saws wire models, household gifts. Send only $1. Boleyn, 15363 Tuller, Detroit, Mich.

INVENTIONS

INVENTIONS—Patented, Unpatented. Work bought, royalty. Hunt-Dacanay Co., Hewes Building, San Francisco, California.

INVENTIONS of merit, patented and unpatented sold on commission basis. Write W. H. Miller, Box 5265, Shawano, Wisconsin.

INVENTIONS Commercialized. Patented or unpatented. Write Adam Fisher Mfg. Co., 582 Enright, St. Louis, Missouri.

INVENTORS

INVENTORS—Sell your inventions before patenting. Free particulars. Write W. T. Greene, 942 Barrister Building, Washington, D. C.

MAGIC GOODS

MAGIC catalogue. Wonderful knockout card trick. 10c. Singer, 444 Hancock, Wisconsin.

MAGIC

LEARN MAGIC. Large illustrated catalog of tricks you can do, 25c. Holden, 222 W. 42nd St., N. Y.

145 MAGIC TRICKS—25c by Houdini and other magicians. Illustrated. Fully explained. Bound volume, 1¼ in. thick. Educational Supply Co., Dept. 11, Racine, Wis.

MERRY-GO-ROUNDS

MERRY-GO-ROUNDS—New and Used Outfits—Catalog 10c. "Mooremade". LaPeer, Michigan.

CLASSIFIED ADS (Continued from page 23)

MALE HELP WANTED

FOREST JOBS pay available, $200 month. Cabin. Hunt, trap, patrol. Get details immediately. Rayson Service, K-12, Denver, Colorado.

MEN WANTING jobs on new construction work in U. S., So. America, write E. Moore, 1040 Heatsl Bldg., Chicago. Enclose stamp.

MISCELLANEOUS

RECEIVE 100 dimes in letters daily. Instructions guaranteed. Dime plan, Right Chemical Formula Co., 1214 W. Bridge Ave., Blackwell, Okla.

RECEIVE hundreds of letters containing money. Learn how. Stamp for particulars. Gardar 3026 10th Ave. Los Angeles

WE BUY almost everything. Discarded jewelry, coins, teeth, silverware etc., especially. Cash by return mail. Schiller's, 444 9th St., N. W. Washington, D. C

LEARN baffling escape tricks and others. Work vaudeville. Houdini made a fortune. Particulars free. Gardar 3026 10th Ave., Los Angeles.

MINIATURE SHIPS

MOORN house ready made beautiful cruiser model 12 inches long for only $2.50. Ship Company, 10543-104 Street, Edmonton, Canada.

MOTORCYCLES

SEND 15c for illustrated used Motorcycle catalog. Large stock. Bargains, Indian parts. Accessories. Indian Motorcycle Sales, Kansas City, Mo.

USED motorcycle parts. All makes, list free. Zolman, 3123 So. Broadway, St. Louis, Mo.

MODEL ENGINE

SUPER Fast 34" Hornet, and Metre "Falcon" Hydro Hulls. 1 lb. 34"x34" gasoline motor. Miniature ignition outfits for Model Boats. Catalog 2c. curn. P. Loutrel, 96 McDonough St., Brooklyn, N. Y.

MODELS

YOUR Ideas developed into practical, working models. 30 years successful experience, thousands satisfied customers. Confidential service guaranteed. Rank Engineering Co., Send for free 32 page book "Making Inventions Pay." Crescent Tool Company, Dept. T, Cincinnati, Ohio.

MODEL MAKERS

MODEL MAKERS Brass, copper, fibre, steel and aluminum in all shapes, also castings, gears, screws and bittings. Catalog 10 cents. Experimenters Supply House, Dept. M, Box 10, Station Y, N. Y.

MOTOR WINDING DATA

MOTOR WINDERS- Winding data, 100 motors, special selection, various horsepower and voltage, $1.00. Motor Data Service, 3002 Monroe, Kansas City, Missouri.

MOVIE CAMERAS

MOGULL'S 16MM movie bargains! Eastman 'C' Projector (like new) $21.50. Stewart Warner New 4 speed Camera $24.00. Trades considered. 400' projector $6.50. Eastman Spicer $1.28. 400' Reels 18c. Humidor Cans 49c. Largest Rental Library (soundsilent) Membership free. Request catalog. Mogull Bros., 1944-6 Boston Road, N. Y. C.

NOVELTIES

8 SURPRISING Novelties, Catalog and Puzzles—all 15c. Roselle, 5049-N Bernard, Chicago.

PALMISTRY

PALMISTRY. Pleasure or profit. Chart explains every type hand. 50c prepaid. Gardar 3026 10th Ave. Los Angeles

PATENTS

PATENTS. Booklet free. Highest references. Best results. Reasonable fees. Watson E. Coleman, Victor Building, Washington, D. C.

GET your own patents; legal blanks, complete instructions $1. Cudding Sons, Campbell, Calif.

PATENTS—Reasonable terms. Book and advice free. L. F. Randolph, Dept. 341, Washington, D. C.

INVENTIONS Commercialized. Patented or unpatented. Write Adam Fisher Mfg. Co., 582 Enright, St. Louis, Missouri.

PATENT ATTORNEYS

INVENT something! New discoveries have created big impressions. Unpatented ideas can be sold. I tell you how and help you make the sale. Free particulars. Richard B. Greene, 958 Barrister Building, Washington, D. C.

PATENT Your invention now. Little ideas may have big commercial possibilities. Send for free book, "How to Obtain a Patent," and free "Record of Invention Blank." In business since 1909, specializing in patent matters, we have successfully served thousands of inventors. Delays are dangerous in patent matters—act at once and protect your idea. Reasonable fees. Deferred payments. Write us today. Victor J. Evans & Co., 767 Victor Building, Washington, D. C.

PATENTS—Before too heavy an outlay of time or money is made on an invention, a search of the Patent Office records should be made to determine as nearly as possible whether or not the same idea has been patented before. The cost of this search is small, while the value of the facts it uncovers is often unestimable. We offer inventors and manufacturers a thorough, prompt, confidential search service—plus experienced counsel and assistance in every phase of Patent and Trademark practice. Write for my free book containing valuable information relating to patent procedure. Clarence A. O'Brien, Registered Patent Attorney, 28-X Adams Building, Washington, D. C.

PHOTO FINISHING

ENLARGEMENTS. Glossy, heavy weight. 5x7 15c, four for 50c; send coin, films. Commercial Photo Service, Riverton, Illinois

PHOTO DEVELOPING

FILMS developed 5c per roll; prints 3c each. Send for Special Bargain List. Roanoke Photo Finishing Company, 159 Bell Avenue, Roanoke, Va.

PRINTING

PRINT your own cards, stationery, circulars, advertising, etc. Save money. Easy rules. Print for others, big profits. Junior press, $5.90; job presses, $11; power, $149. Write for free catalog and full information. Kelsey Co., S-57, Meriden, Conn.

1,000 PERSONAL or Business Cards $1.25. Sample order, 200: 50c. Emco, 321 N. Howard, Akron, Ohio.

PERSONAL

UNHAPPY? Troubled? Unsuccessful? This psychologist can help you. Gilbert, 214 Adelaide West, Toronto.

RABBITS

RAISE rabbits for us. We supply stock and buy what you raise. Catalog for stamp. Stahl, Suite 31, New City N. Y.

RADIO

GUARANTEED "Pocket Radio" $2.00. Catalogue, 10c. Neil Tasker Shamokin, Pennsylvania.

SHORT Wave Sets, Kits, Supplies. Wholesale Catalog 10c. Federal Telegraph, 4222 Clifford Road, Cincinnati, Ohio.

REAL ESTATE

OZARKS Five acres timbered river frontage, fishing, boating, pearling, shooting—$100, $5.00 monthly. Hubbard, 224 Grossman Bldg., Kansas City, Kans.

ROOTS AND HERBS

JUST OUT! World's greatest "Herb Almanac." Beautifully illustrated in natural colors. Contains over 500 old fashioned herb medicine recipes and 'How-to-secrets' for home use. 10c (coin) postpaid. Worth dollars! Bontanic-145 W. 112th St., Chicago.

SECRET SERVICE

SECRET Service Methods. Particulars free. Excellent opportunity. Experience unnecessary. Write, Wagner, 2640-Y, Broadway, N. Y.

SONGS, POEMS, WRITERS

SONG writers wanted now. 50-50 plan. Indiana Song Service, Salem, Indiana

SALESMEN WANTED

STRANGE chemical sponge washes windows without work. Banishes cleaning drudgery. Housewives amazed. Hustlers cleaning up. Outfit Free. Kristee Mfg. Co., Box 2501, Akron, Ohio.

SPECIAL OFFER

COMIC drawing of yourself. Send photograph and 50c. Fulton Studio, Bx600, Cleveland, Ohio.

THE WORKSHOP

HAVE you a Home Workshop? If you want it to pay dividends write for free Illustrated information about making unique novelty. Easily made. Readily sold. Something New. W. H. Cobb, 12 Tenth Avenue, Hendersonville, N. Carolina.

TRAILERS

CATALOGUE of camp trailer plans now available. Enclose 10c to cover mailing cost. Toellen Trailer Service, Box 25, College Park Sta., Detroit, Mich.

VENTRILOQUISTS

LEARN Ventriloquism by mail; small cost, 3c stamp brings particulars. Geo W. Smith, 325 North Jefferson, Room S588, Peoria, Ill.

WANTED TO BUY

WANTED: Cash paid for old books, almanacs and novels. List of books wanted 25c. Richard, 349 Summer St., New Bedford, Mass.

SAVE Indian Head Pennies! We pay up to $20.00 each. Send dime (coin) for list. Ingram, 314 Third, Greensburg, Pennsylvania.

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

New Kind of Band Saw

New 14-in. "Delta" Band Saw

Embodies Remarkable New Features Never Before Found in This Type of Machine.

Basic new changes that actually increase efficiency, accuracy and convenience of operation—are to be found in this astonishing 1934 "Delta" motor-driven tool. It is the first really improved band saw in years! Has new Independent Micrometer Adjustments for guides, Tilting Table on ingenious Double Trunnion Supports, Increasable Capacity Frame, New Safety Disc Type Wheels. New convenient arrangement for quick, accurate adjustment and many other features. Can use ¾" wide blade. Convertible into metal cutting saw, with proper slow speed. Priced surprisingly low, within the reach of all. Every woodworker, whether in home or factory workshop, should learn the full details about this revolutionary new "Delta" Band Saw.

Complete Line of 1934 Motor-Driven Woodworking Tools

New improvements and new features make the complete 1934 line of "Delta" Motor-Driven Tools of unusual interest to all Woodworkers. The "Delta" line includes: **Jointers, Circular Saws, Band Saws, Scroll Saws, Drill Presses, Woodturning Lathes, Boring, Routing, Sanding,** and **Mortising Attachments,** and a complete line of accessories.

10-Day Trial EASY TERMS!

Because "Delta" Tools are efficient and practical under actual working conditions they are always available for 10-day trial without the slightest risk. Satisfaction guaranteed.

FREE CATALOG

Every man who works with wood—in factory or home workshop—will want to see this FREE 1934 "Delta" Catalog of Quality Woodworking Tools. It shows the full line of latest "Delta" Tools. It is packed with interesting illustrations and descriptions. It describes the latest developments in motor-driven equipment at the astonishingly low "Delta" price levels. Be sure you get your copy. Mail the coupon—Today!

DELTA MFG. CO.
3775 North Holton Street
Dept. M1233 Milwaukee, Wis.

DELTA MFG. CO., 3775 North Holton St., Dept. M1233 Milwaukee, Wisconsin

Please place me, without obligation, on mailing list to receive the **Free** 1934 "Delta" Catalog of Quality Woodworking Tools. Also send full details of your 10-Day Trial Offer and Easy Payment Plans.

Name..... Age?

Address.....

City..... State

Be a TELEVISION EXPERT

America's pioneer television training institution

Free Folder

WOXAL is the ONLY visual broadcasting station in the country offering a training in television.

Learn television at WOXAL, a real station on the air. Unusual station. Big opportunity to get ahead. Protected home television sets will undoubtedly appear on the market on the NEXT BIG BUYING WAVE. Get your thinking cap on the only broadcast station in the nation where you can get experience while programs are broadcast. Learn to operate the transmitter, studio technique, control room operation and many other jobs by actually doing the real thing. Be the real experience that counts today when television is here. Unsurpassed Training. Thorough training under Interstate Supervision. Study television by mail. You must have a license to operate a national television station.

Business leaders predict that New Television system of broadcasting will require thousands of trained men and women. Here's opportunity for thoroughly trained television technicians and experts.

Write today for folder "Pictures on the Air". Just sign and mail coupon NOW.

NRA

BIG FUTURE USE COUPON

PINEY NATIONAL TELEVISION, Inc.
3020 Power & Light Bldg., Kansas City, Mo.

Without obligation, send postpaid FREE Illustrated Folder "Pictures on the Air" telling about your opportunities in television. I am 15 years or older.

Name .....

Address .....

Age .....

WHY STAMMER?

Write for Free booklet "Helps for Stammerers"

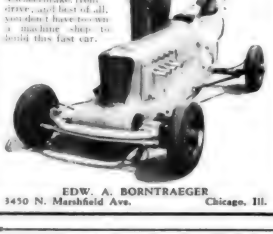
Sample Copy of "SPEECH" Free

STAMMERERS' GUILD, 38 Newbury St., Suite 404A, Boston, Mass.

BUILD A FRONT DRIVE!

The construction of a real modern front drive auto as this "SILVER BULLET" with my surprisingly simple drive arrangement, using "V" Ford parts, easy with my blueprints. With your motor cycle motor, part crabby 4 cyl., and other old car parts, you can make this Fashion-Ideal front driver, and best of all, you don't have to own a machine shop to build this fast car.

Send stamps for further details and immediate reply.



EDW. A. BORNTRAEGER
3450 N. Marshfield Ave. Chicago, Ill.

Change Attachments INSTANTLY

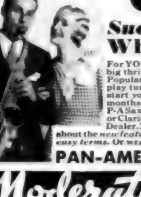
Special Offer

Carve, Drill, Grind Disc, Saw, Polish Sand, Buff

Here is a superior tool built especially for the craftsman requiring accurate work. Each attachment is mounted on a separate mandrel for perfect alignment. To change attachments, merely loosen handwheel and slip into draw-in collet. Built to last a LIFETIME. Satisfaction GUARANTEED or money refunded

We will send this $3 Morse Bench Head with POST PAID for $2.95 when cash accompanies order or send $1—pay balance C. O. D. We will include, FREE 4" x ½" all purpose grinding wheel, 4" x ¼" cut and one strip-up "J" mandrel. Write for booklet on other special attachments and full information.

WISCONSIN ABRASIVE COMPANY
8909 Br., Station A, Milwaukee, Wis.



QUICK Success ... and What a Thrill

For YOU! Quick success! Then all the big thrills of life, with your P-A Sax! Popularity; a soft job; big pay. Many play tunes first week; join a band or start your own dance orchestra in 3 months, with a free blowing tune sure. P-A Sax, Trumpet, Trombone or Clarinet. See your local P-A Dealer. Try instrument. Ask about the new features, moderate prices, easy terms. Or write us for free booklet.

PAN-AMERICAN 1230 P-A BLDG. ELKHART, IND. 1094

Moderate Price

NEED MONEY?

Write for free booklet describing "87 Plans for Operating a Successful Business of Your Own". Make from $20 to $100 a week starting in spare time at home. No peddling or house-to-house selling. Booklet sent free, and without obligation. Write for your copy today.

ELITE PUBLISHING CO.
Dept. G 214 Grand St. New York, N. Y.

FREE BOOK

HANDY MAN'S HOME MANUAL Is On Sale at All Newsstands for 50 Cents

for MORE PAY learn DRAFTING

From An ENGINEER

GET READY FOR PROSPERITY. Be ready for BIG PAY. I will train you at your home by mail on Practical Drafting until in POSITION, or prepare you for BETTER PAY on the Job you have. All tools and drawing table sent at once if you enroll now. WRITE FOR FREE BOOK.

ENGINEER DOBE. 1951 Lawrence Avenue Div. 29, Chicago

Learn Photography at HOME

Make money taking pictures. Prepare quickly during spare time. Also earn while you learn. No experience necessary. New easy method. Nothing else like it. Send at once for free book. OPPORTUNITIES IN MODERN PHOTOGRAPHY, and full particulars.

AMERICAN SCHOOL OF PHOTOGRAPHY
Dept. 2099, 3601 Michigan Avenue Chicago, U. S. A.

DIESEL Offers YOU BIG OPPORTUNITIES

DIESEL NEWS IS BIG NEWS—The hand-writing is on the wall. In every industry Diesel is fast replacing all other forms of power — crushing thousands of jobs for trained men.

Enter this new virgin field now — join the ranks of successful HEMPHILL graduates — many graduates now being placed. We teach you in 8 to 12 weeks' time. Life membership. Free National Employment Service. Learn Diesels in our Big Nationally recommended Diesel Schools and Shops. Expert Diesel instruction — all practical training — many types of engines to overhaul and operate. No previous experience necessary. We teach you from the ground up. Diesel opportunities will amaze you — our FREE DIESEL BOOK tells all.

WRITE FOR FREE BOOK

BOOK K Explains All Practical School Course
BOOK H Explains Home Study (by Mail) Course

HEMPHILL DIESEL ENGINEERING SCHOOLS, INC.
2103 San Fernando Rd., Los Angeles 5032 Westlake North, Seattle, Wash.
246 E. 19th St., Kansas City, Mo. 2020 Walnut St., Denver, Colo.

FIND GOLD

GUGGENHEIM GOLD DETECTORS Lead You To It

TOWER PLACER WASHER AND CLEANUP MACHINE PAYS FOR ITSELF IN 10 DAYS

Guaranteed to detect gold and silver anywhere. Used by Prospectors, Miners, Tourists and Treasure Hunters everywhere to locate lost jewelry, buried treasure, rich gold pockets and mines. Prospector in Merced Co. located 2 gold claims in week. Many recent fortunes made by gold seekers. Send $1 for small size, $1.50 for std. size, or $3 for professional size in leather case, and directions. 10-day money refund guarantee.

Varies all the gold in ordinary placer gravel. Eliminates rocks and all losses from panning. Waives tailing costs. Amalgamates and concentrates at same time. Can be used in grid regions. 24 in. bowl. $150.00 complete.

GUGGENHEIM EQUIPMENT COMPANY
Dept. 30-M, 110 Sutter St. San Francisco, Calif.

Thread cutting lathe and Counter-shaft $55.00 use same in gearless to shift carriage while cutting threads. 12" Band Saw with tilting table $18.00. Send for Catalogue on these and other machines.

ROSSBACHER MACHINE CO.
1516B Fernwood Ave. Toledo, Ohio

WONDERFUL NEW INVENTION

SOLDERING IRON AND BLOW TORCH IN ONE

Pays for itself in one job! Needs no pump or pressure system — no stove — no charcoal — no separate blow torch. Burns an hour at less than ¼ cent for gasoline.

AGENTS' OFFER

Write for Special Offer to agents. The Justrite is an ideal proposition for either main line or side line — full time or spare time.

JUSTRITE MFG. CO.,
2067 Southport Avenue, Chicago, Ill.

DRAFTING

Learn at Home

DRAFTING pays good salaries and is the stepping stone to even better positions. Many leading architects, mechanical engineers and electrical engineers got their start at the drafting board.

There is no easier or more practical way to learn Drafting than through the home-study courses of the International Correspondence Schools. Employers are constantly writing us for trained men. We receive more calls for I. C. S. draftsmen than for graduates of any other course.

F. E. King was "a poorly paid clerk" when he enrolled for the I. C. S. Drafting Course. By study, industry, and perseverance he became Chief Draftsman of the U. S. Steel Furniture Company, of Syracuse. He is now earning more in a day than he used to earn in a week.

A. J. Hutchins became Chief Draftsman for the American Strawboard Company and increased his salary 300 per cent—also as a result of I. C. S. Training.

Just mark and mail the coupon and we'll gladly send you a booklet telling all about the I. C. S. courses in Drafting or other subject in which you are interested.

INTERNATIONAL CORRESPONDENCE SCHOOLS
Box 2322-D, Scranton, Penna.

Without cost or obligation on my part, please send me a copy of your 48-page booklet, **"Who Wins and Why,"** and tell me how I can qualify for the position, or in the subject, *before* which I have marked an X:

Mechanical Drawing	Structural Drafting
Shipbuilder's Course	Architectural Drawing
☐ Architect	☐ Aviation Engines
☐ Building Foreman	☐ Plumber and Steam Fitter
☐ Concrete Builder	☐ Plumbing Inspector
☐ Contractor and Builder	☐ Foreman Plumber
☐ Structural Engineer	☐ Heating and Ventilation
☐ Electrical Engineer	☐ Sheet-Metal Worker
☐ Electrical Contractor	☐ Steam Engineer
☐ Electric Wiring	☐ Marine Engineer
☐ Electric Lighting	☐ Refrigeration Engineer
☐ Electric Car Running	☐ R. R. Positions
☐ Telegraph Engineer	☐ Highway Engineer
☐ Telephone Work	☐ Chemistry ☐ Pharmacy
☐ Mechanical Engineer	☐ Coal Mining Engineer
☐ Marine Shop Practice	☐ Navigation ☐ Assayer
☐ Toolmaker	☐ Iron and Steel Worker
☐ Patternmaker	☐ Textile Overseer or Supt.
☐ Civil Engineer	☐ Cotton Manufacturing
☐ Surveying and Mapping	☐ Woolen Manufacturing
☐ Bridge Engineer	☐ Agriculture ☐ Fruit Growing
☐ Gas Engine Operating	☐ Poultry Farming
☐ Automobile Work	☐ Mathematics ☐ Radio

BUSINESS TRAINING COURSES

☐ Business Management	☐ Business Correspondence
☐ Industrial Management	☐ Show Card and Sign Lettering
☐ Personnel Management	☐ Stenography and Typing
☐ Traffic Management	☐ English
☐ Accounting and C.P.A. Coaching	☐ Civil Service
☐ Cost Accounting	☐ Railway Mail Clerk
☐ Bookkeeping	☐ Mail Carrier
☐ Secretarial Work	☐ Grade School Subjects
☐ Spanish ☐ French	☐ High School Subjects
☐ Salesmanship	☐ Illustrating ☐ Cartooning
☐ Advertising	☐ Lumber Dealer

Name .....
Street
Address .....
City ..... State .....
Occupation .....

If you reside in Canada, send this coupon to the International Correspondence Schools Canadian, Limited, Montreal, Canada

How NEAR is
TELEVISION?

What are the latest developments in this fascinating science? What technical difficulties have yet to be overcome?

Read about it in the DECEMBER

RADIOLAND

The NEW Magazine of the Air

OTHER FEATURES IN THIS ISSUE—The truth about radio stars' salaries. Radio in the Cuban revolution. Personality stories on Ramona, Mildred Bailey, Jack Benny, Rubinoff, Jimmy Durante.

BUY YOUR COPY TODAY 15c

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

AVIATION Holds a Wonderful Future

Come to LINCOLN

Where you are certain of getting the proper training to equip you for the big pay jobs in aviation.

Government Approved School. Unexcelled equipment. Training by Government Licensed Instructors, including blind flying, cross country, acrobatics, master mechanics, airplane and engine course. Now is the time to start training. Exceptional opportunities in both Central and South America as well as in U. S. Aviation courses taught in either English or Spanish. Write! State your age.

LINCOLN AIRPLANE & FLYING SCHOOL
400C Aircraft Bldg., Lincoln, Nebraska

DIAMONDS *On Credit*

Make This a Jewelry CHRISTMAS!

Give Diamonds, Watches, Silverware AT LOWEST PRICES IN YEARS! Act fast before prices go up! Write for Catalog Today! Everything confidential.

No. 15 — Ensemble — 7-Diamond Engagement Ring of Solid Gold! 5-Diamond Wedding Ring to match, both for price of one . . . $26.85
$1.00 a Week

SEND FOR FREE CATALOG

TERMS. One-tenth down; balance weekly, semi-monthly or monthly your convenience.

LOFTIS BROS & CO.

CATALOG EXPLAINS EVERYTHING Full Particulars of Loftis Easy Credit Plan. Write today.

30 N. STATE ST., CHICAGO, ILL., DEPT. G-285
YOUR MONEY BACK IF NOT SATISFIED

ARC FURNACE

200 STUNTS

Electric Fun with 110 volts! How to make arc lights and furnaces, motors, obedient lights, alarms, and 195 other practical, mysterious and amusing devices. Book clearly explains how to do each stunt. Postpaid $1. Experiment and inventors catalog free.

CUTTING & SONS 123 D St., Campbell, Calif.

Get Your Own Patents

Pay only government fees. Legal blanks and book with complete instructions, postpaid $1.
CUTTING & SONS, 123 D St., CAMPBELL, CAL.

CARTOON YOUR WAY TO SUCCESS!

DON'T COPY - LEARN TO ORIGINATE!

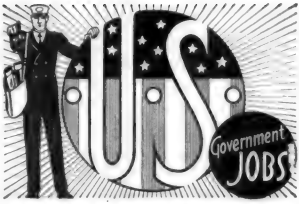
RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS at home that you can SELL! Course has 26 lessons and 600 illustrations. *Send name and address for free details.* Only.... **$2.85**

RAYE BURNS SCHOOL, Dept. F-X, Box 2194, CLEVELAND, OHIO

WANTED — Ambitious Men and Women
Become EXPERT ACCOUNTANTS
EARN MORE—Get Rid of Money Worries

Trained Accountants command *responsible* positions and big incomes. Changed business conditions have enormously increased the demand. A new, "*easy-to-understand*" Course—*simplifies Accountancy*. Lessons prepared and teaching supervised by one of America's foremost accountants. We train you thoroughly in spare time at home for important executive accounting positions and to qualify for C. P. A. Exams. Bookkeeping experience not necessary. Low cost—easy terms. Send for FREE BOOK—TODAY. NO LETTER NECESSARY. Mail this ad with your name and address.

National School of Commerce, 536 So. Clark St., Chicago. Dept. A-6



$1260 to $3400 a Year

PICK YOUR FUTURE JOB
MEN, BOYS—18 to 50

Travel—See Your Country

Railway Postal Clerks get $1,900 the first year, being paid on the first and fifteenth of each month. ($79.17 each pay day.) Their pay is quickly increased in normal years, the maximum being $2,700 a year ($112.50 each pay day.)

Railway Postal Clerks

3 Days On—3 Days Off—Full Pay

Railway Postal Clerks on long runs usually work 3 days and have 3 days off duty or in the same proportion. During this off duty their pay continues just as though they were working. They travel on a pass when on business. When they grow old, they are retired with a pension.

City Mail Carriers, Post Office Clerks

Clerks and Carriers now commence at $1,700 a year and in normal years automatically increase $100 a year to $2,100 and $2,300.

Customs and Immigrant Inspector

Salary $2,100 to $3,300. Men 21 to 45. Work connected with examining immigrants and merchandise entering the country from foreign parts.

You Can Get Them

Experience is usually unnecessary and political influence is not permitted. Let us show you how.

Get Free List of Positions

Fill out the following coupon. Tear it off and mail it today—now, at once.

This investment for a postage stamp may result in your getting a government job.

FRANKLIN INSTITUTE, Dept. R-311, Rochester, N. Y.

Rush to me entirely free of charge (1) a full description of the position checked below; (2) Free Copy of 32-page book, "How to Get a U. S. Government Job"; (3) A list of after depression U. S. Government Jobs; (4) Tell me how to get a Government Job.

- ☐ Railway Postal Clerk ..... ($1,900-$2,700)
- ☐ Post Office Clerk ..... ($1,700-$2,300)
- ☐ City Mail Carrier ..... ($1,700-$2,100)
- ☐ Rural Mail Carrier ..... ($2,100-$3,400)
- ☐ Government Clerk—File Clerk ..... ($1,260-$2,500)
- ☐ Inspector of Customs ..... ($2,100-$3,300)
- ☐ Immigrant Inspector ..... ($2,100-$3,000)

Name .....

Address .....

Use This Coupon Before You Mislay It

MODERN MECHANIX

This "Hammer of the Future" is a balanced head which is screwed on to prevent its flying off the handle. But who'd want to fly off the handle with pretty Greta Christenson near?

A schoolhouse without a foundation! This is a Swiss design—modernistic—for a building at a university.

Martin Bodkin, who hates radio crooners and hillbillies, suffers from a strange rheumatic fever near a radio set unless he grounds himself with a cane and wire in a pan of water!

Above is a working model of Boulder Dam, built at a cost of $500 by the Las Vegas, Nevada, Chamber of Commerce. It is complete even to a real power house and running water!

Here's the railplane—a streamlined, self-propelled railway coach designed for 90 miles an hour passenger service. It weighs one-sixth the weight of an ordinary coach, seats sixty, is fifty feet long, and requires 10 per cent of usual power.

AND INVENTIONS

MECHANICAL NEWS of the Month

Pictured here are the latest news shots of developments in the world of science, engineering and plain home mechanics. Each thirty days sees a galaxy of new ideas which our alert cameramen catch for your enlightenment, instruction and amusement.

Introduced by a German Sanitary engineer in Dresden, this practical bath tub for apartment dwellers is an idea American manufacturers should get busy on.

Pauline Campbell, pretty 18-year-old Venice, Calif., beachcomber, really combs a mean beach! She pays her way through high school by sifting the sands at Venice and recovers many valuables.

Alan Gould, Associated Press sports editor, is shown above in the press tent off the Kehwood golf course at Cincinnati, Ohio, demonstrating how the United States amateur and other golf tournaments are now being covered. Sports reporters following the play speak directly into a short wave transmitter to give a play by play report of the meet. Plays are recorded as they happen, eliminating delays by messengers. Gould writes the running story without seeing the tourney.

DARING DEATH With

The four daring photographers above risked their lives to get an unusual view of the bomber as it took off. The camera on the left was wrecked by the plane, the cameraman dodging sudden death by a very close margin.

This camera was smashed by plane taking off in the photo above.

This ingenious little ankle camera snapped the sensational picture of Ruth Snyder dying in the electric chair. Left to right are: George Schmidt, Tom Howard, who defied arrest to get the photo, and Ted Dalton, the author.

THE universal clamor today is for pictures—for action photographs of thrilling drama, of death-defying adventures, and of disasters in every quarter of the globe.

The news cameraman must satisfy that demand no matter how near Death's sombre shadow may hover over him. When a train is wrecked, when an airplane crashes, when an earthquake tumbles a city in ruins, or when a battle is fought, the world is not satisfied to read about it.

The public wants to see it—to see men facing danger, fighting for their lives, meeting death, whether it be in the wilds of Africa or on the broad expanses of the seven seas.

Cameraman Must Stalk Danger

The cameraman, therefore, must stalk danger and death, too, all over the face of the earth. He must bring to the newspaper and movie audience the whole range of human and natural activity.

No event worthy of popular attention is beyond the confines of his work. No big catastrophe is too far or too terrifying to pass unchallenged by his determination to bring back to the newspaper or the movies the photographic narrative of what occurred. It is always vivid, graphic, convincing, and often full of awe.

During the fourteen years that I have been on the staff of the New York News I have planned and participated in outstanding picture scoops that were scored by meeting danger face to face.

One of the most spectacular photographs to come to public attention was taken by a New York News photographer. That was

The INSIDE STORY of the RISKS TAKEN by

NEWS CAMERAMEN

by TED DALTON

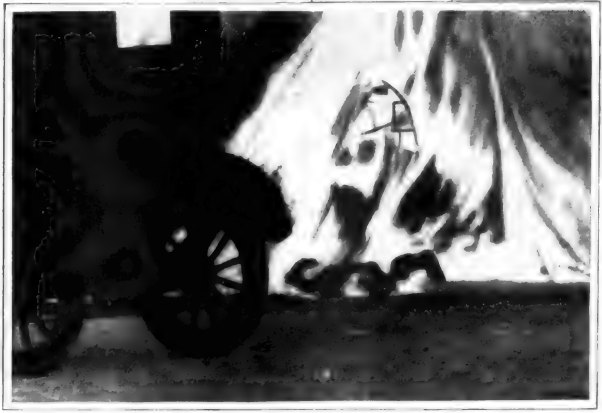
Picture Assignment Editor, the New York News.

Why wasn't De Pinedo rescued—why couldn't mechanics save him if photo sleuths got close enough to take tragic shots—

Why do news cameramen dare death, go to any length to get pictures of executions, burning munitions factories, gang wars—

Ted Dalton, camera ace, gives the answers in this thrilling yarn about Unsung Knights of the Shutter

General Francesco De Pinedo, famed Italian flyer, above, in his plane just before his horrible death, shown below.



Copyright by Pathe News.

This spectacular photograph of De Pinedo burning to death in the wreckage of his plane was taken by a daring cameraman who remained calm when tragedy struck. The uplifted arms and body of the flyer can be seen in the flames.

the sensational picture of General Francesco De Pinedo's blazing plane with the flyer trapped in it, burning to death.

A gruesome picture, to be sure, but on the other hand no more shocking than the word picture of the same episode by capable reporters. Perhaps I am prejudiced, but I believe this picture had more of the dramatic and tragic than any written story. The cameraman who took that picture had to remain calm while death struck before his very eyes.

Photographers in Scoring Sensational Scoops

Swerving sharply, as shown above, to avoid crashing into the fence at right, De Pinedo's plane turned over, burst into flames before fire fighter or cameramen could rescue him.

Cameramen have been injured in auto race spills like that above. The photographers are posted at dangerous curves where death lurks.

Even steer baiting is in the realm of Cameraman Don Brinn above. He's a bit uncertain, but saved his hide and the cameras in time.

De Pinedo was attempting to fly from Floyd Bennett Field, Long Island, to Bagdad. On the morning scheduled for the hop-off, I had a chartered plane at the field.

It was stationed a little distance back of De Pinedo's. It was faster than the general's plane and could keep up with him until we obtained the necessary pictures showing the take-off. In addition I had three photographers posted at intervals along the run-way. The third man was at the end of the take-off course. This arrangement assured us of a complete pictorial reproduction of the flight down the runway.

As De Pinedo started off he was also

While shells burst around him, Photographer Al Willard climbed the 100 foot tower at the right to get the above photo of a burning ammunition depot.

trailed by a motorcycle with a side-car, carrying fire-fighting apparatus to fight any blaze which might break out. Every plane starting on a hop is followed by this motorcycle.

De Pinedo shot down the runway and on reaching close to the end of it he realized he was not going to lift himself over the fence. Rather than dive into the gully on the other side of the fence, he suddenly swerved off the course and careened over, directly in front of Bill Casselman, a News copy editor with whom photography is a hobby.

He kept cool in the face of this tragedy unraveled at his very feet, and "shot" one of the most sensational pictures that has ever been made. His reward was a handsome bonus.

There was no possible way of saving De Pinedo. The motorcycle fire fighter tried in vain to extricate the aviator from the flames and was so badly burned he had to be taken to a hospital.

The photograph that caused the greatest sensation among newspaper readers was the picture of Ruth Snyder dying in the electric chair. She and Judd Gray were condemned to death for the murder of Albert Snyder, a magazine art director. My orders were to get a picture of the electrocution. It was a laconic command, but it was up to me to produce the picture. I learned

Defying death to get this closeup picture of the mighty under-sea volcano Krakatoa in eruption, J. H. Becker, a movie cameraman, approached within 150 feet of the roaring column of millions of tons of lava, molten glass and steam.

The Greatest Sea Disaster Photo Was Taken by an Amateur Cameraman

Stark drama and tragedy are portrayed in this photo of the sinking of the Vestris.

Fred Hanson, member of the crew of the Vestris, snapped the finest sea disaster pictures ever taken with the small folding camera he is holding in contrast to a news camera. He received thousands of dollars for the photos.

The movie cameraman who took this photo of Gladys Ingalls climbing from one plane to another—dared death as much as the stunting aviatrix. He stood on the wing of the lower ship to take the picture.

Perched on a skyscraper to get a photo of Times Square.

that a photograph of an execution had never been made at Sing Sing prison.

The first problem I was up against was in selecting the right man for the job. He had to be a stranger to New York photographers and reporters. Other newspapers were planning to get the same picture and

(Continued on page 133)

Jap Clockspring Car Runs 40 mi. a Winding

Modern Mechanix and Inventions artist here caricatures a radical departure in automotive engines, a clockwork motor recently introduced by Japanese. Reports state car runs 40 miles at one winding.

THE Japanese have never gained any notable degree of fame for their mechanical capabilities, but undoubtedly their reputations along this line will get vigorous boost by their invention of an automobile that runs by clockwork.

Very little mechanical data is available on the construction of the new car, but it is said to have British car dealers doing business in Japan somewhat worried. This would indicate that the machine is more than just a freak that originated in the mind of a visionary inventor.

Reports state that the car will run 40 miles at one winding. Further developments may see the invention of an eight-day machine. A MODERN MECHANIX AND INVENTIONS artist has caricatured the contraption above.

Frozen Honey Is New Delicacy

A NEW delicacy has made its appearance to tempt the palate. It is frozen honey in the form of an all day sucker and tasting like sherbet. Ingredients are one part honey and two parts water, a composition which freezes readily.

Golf Club Cart Abolishes Caddy

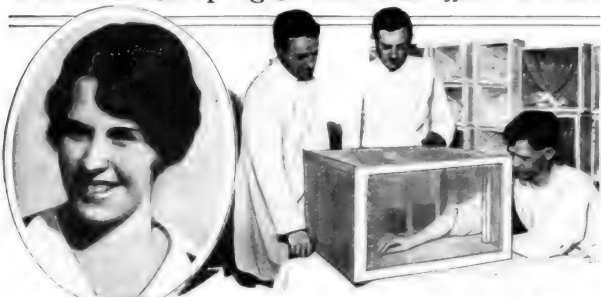
A NEW golf club cart now on the market may relegate the caddy to oblivion, along with the telegrapher, the movie theatre musician and the horse.

The cart is built along the lines of the truck commonly employed in wheeling boxed goods. The golf bag straps to the handle, its bottom resting on a small platform.

When moving the clubs from one hole to another, the golfer simply takes the cart in tow and wheels along over the fairway to the next tee.

Golfers carry their own clubs on truck, eliminating caddies.

DREAD *Sleeping Sickness Baffles Science*



A victim of sleeping sickness, Patricia Maguire (above) of Oak Park, Ill., has been in a state of coma for almost 2 years. Science cannot awaken her.

Offering himself as a possible victim to the dreaded sleeping sickness, Sergeant Jesse F. Rhoads, of Jefferson Barracks, St. Louis, is shown allowing mosquitoes to feed on his arm. Major Virgil H. Cornell (left) and Major James J. Simmons, Army medical experts, are looking on.

Sergeant George F. Luippold is shown above inspecting one of the rhesus monkeys, bitten by mosquitoes that had fed on an encephalitis patient. Major James J. Simmons is at right.

AN ENEMY so tiny that it cannot be detected by the most powerful microscope is giving medical science one of the greatest battles of its historic career. And thus far science can not claim the victory.

The enemy is the mysterious transmission agency responsible for the spread of the strange malady of sleeping sickness or "encephalitis" because it attacks the "encephalon," or brain. The epidemic in St. Louis, Mo., and its suburbs is the largest outbreak the country has ever known.

Science's enemy in this battle is a powerful one. In less than two months' time it numbered its dead at close to 200 and its casualties, all those who contracted the disease, at nearly 1,000 in the vicinity of St. Louis alone. The unusual symptoms of sleeping sickness are: stiffness of neck and back, intense headaches, fever, the patient's peculiar, far-away, dreamy expression, and finally stupor.

To a young woman scientist, Dr. Margaret Smith, pathologist at Washington University of St. Louis, went the first signal victory. She discovered that the disease was caused by a filterable virus, rather than by any bacteria visible under a microscope. But despite Dr. Smith's brilliant discovery medical science still knew very little about "encephalitis."

By a process of careful elimination it was determined that neither food, nor water, nor milk was responsible for the spread of the disease. Insects, particularly mosquitoes, came under scrutiny of the combined city, county, state and federal medical experts.

Mosquitoes were allowed to feed on encephalitis patients and then bite rhesus monkeys. Eventually three brave scientists offered themselves as "human guinea pigs." They allowed themselves to be bitten by the mosquitoes, but considered their heroic act part of the day's work. They thought so little of it that they requested that their names be kept secret.

Experiments with mosquitoes have failed to bring results. Investigators are more inclined to believe that the disease is carried rather by human agency, particularly through the nose and throat.

One important step has been accomplished. Monkeys have been infected by innoculating them with matter taken from human encephalitis patients.

Palatial Ice Boat Carries Nine, Speeds at 125 M. P. H.

Just add wings and this speedy, comfortable ice boat, driven by a 200 h.p. radial engine, would take the air!

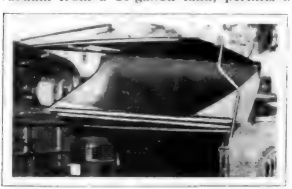
This sign helped defray cost of constructing the boat.

THE grand-daddy of all ice boats, a motor-driven affair weighing some 1,800 pounds and carrying nine persons, has recently been completed by Alfred de la Barre, a Minneapolis man, who is using it this winter on Lake Minnetonka.

The boat is 25 feet long with a body of aluminum patterned after a cabin airplane. It has four port holes on either side, one to each of the eight seats.

It is powered by a nine-cylinder, 200-h.p. radial engine, which is set directly in front of the pilot's seat. An ingenious system of mirrors, however, permits him to see around the engine and get a clear view ahead. The powerful motor, fed by vacuum from a 30-gallon tank, permits a speed of 125 miles per hour. The three runners each have double blades of case-hardened steel, and may be replaced with a shorter axle and pneumatic tires in case Mr. de la Barre wants to take to the road.

The builder spent his spare time for six years constructing it in a two-car garage at his home. Since its completion he has defrayed part of the cost by exhibiting it.

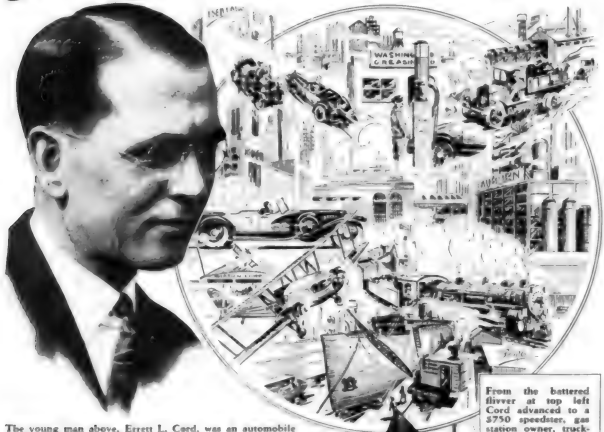


Hood holder gives mechanic unobstructed view of motor.

Hood Holder Facilitates Repairs

MOST of the new model cars and a lot of the old ones have hoods that get in the way of a mechanic working on the motor. Hence the necessity for a hood holder such as the one illustrated at the left, which is a recent invention. It is made of ½-inch cold rolled steel and slips easily onto the radiator shell, keeping the troublesome hood well out of the way. It is especially useful on overhead valve motors and facilitates the removal of the top hose. It works on either side of the car.

Young MISTER CORD



The young man above, Errett L. Cord, was an automobile mechanic and race track driver before he rose sensationally to become head of a vast empire of transportation.

From the battered flivver at top left Cord advanced to a $750 speedster, gas station owner, trucking, Moon auto salesman, Auburn manufacturer, head of airlines, railroads, and now ship-building.

A youth of 20 proudly drove a battered flivver out of a dealer's yard in Los Angeles. The engine wheezed and died.

The youth spun the crank futilely. Then he pushed the car to an incline, and it rolled downward just as he got a precarious footing on the running board. He tumbled into the seat and grabbed the wheel. The motor awoke and the car chugged on.

Three weeks later the youth appeared in the yard—behind the wheel of a glistenningly maroon "speedster."

From Tyro to Titan

"I fixed up that old car, Charley," he said. "Made two trades and fixed them up. Finally I got this one."

The youth was Errett L. Cord. He had left with a $75 dilapidated car and returned with a $750 automobile. He did not stop there. That battered flivver has continued to grow.

Today it has become a virtual empire of motors and wheels. Cord in 1933 is no longer merely an automobile mechanic, but a titan of transportation and a genius of finance. His realm extends over land, sea and air.

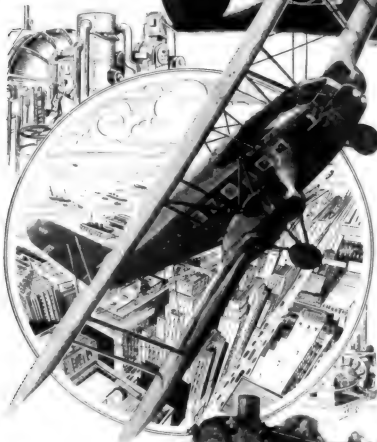
The youth who rebuilt that ramshackle automobile now can build battleships in his own shipyards! His factories turn out thousands of automobiles. His airplanes fly 37,000 miles every day. His amazing finan-

Above—Giant liner in the shipyards of Cord's New York ship-building company, the latest step in his great career.

TITAN of Transportation

From a battered flivver E. L. Cord has built an empire of automobiles, airplanes, ships and railroads. Here is the story of the amazing career of this young mechanic who became a financial genius.

At right is the young genius of finance and transportation, E. L. Cord, standing beside the automobile that bears his name. The Cord was the first front-wheel drive car introduced in America. Cord also controls Duesenberg, Auburn, and the largest taxi companies.



cial fingers have reached even to railroads.

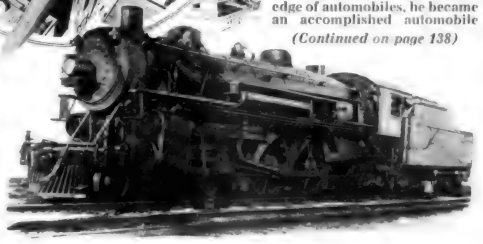
He has fought and conquered Wall Street. But behind his great ability to marshal financial forces is an innate love for motors and wheels and things mechanical.

As president of the $120,000,000 Cord Corporation and chairman of the board of the Aviation Corporation, he continues to look into the future—and events of recent weeks show him steadily gaining not only increased fortune and prestige—but more wheels and motors.

The success of the youthful Errett L. Cord in the field of transportation and finance is one of the most stirring narratives of American opportunity.

Before he was twenty-one, with his love for and knowledge of automobiles, he became an accomplished automobile

(Continued on page 138)



A giant air liner of Cord's American Airways is shown above. Cord defied Wall Street in one of the greatest financial battles to gain control of Aviation Corporation, of which American Airways is a subsidiary. Cord's planes now cover 72 cities in the U. S. and Canada and fly 37,000 miles every day. Cord himself is a licensed pilot. He can even drive the locomotive at right. His realm was recently extended to railroads.

Radio-cooked Toast Never Tastes Burned, Even If Black

Fifi D'Orsay, the screen star, seems to enjoy a ham sandwich toasted for her between the electrodes of a radio transmitter. G. R. Severance, radio engineer, is placing another sandwich in position for toasting.

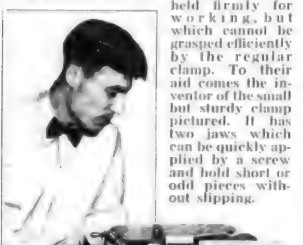
RADIO cooking is the latest stunt developed by broadcast engineers. If a hot lunch is wanted by the operators in a transmitting station, all they have to do is place their food between the electrodes of the transmitter. In a few moments it will be done to a turn. Bread may be toasted in six seconds, but steak and potatoes take several minutes. Oddly enough, food overdone by cooking on the radio transmitter does not have a burned taste. Toast can be charred black without tasting in any way different from the kind a cook would be proud to serve. Engineers are not quite sure just why this is so, but believe it is because the cooking is done by the electric discharge and the electrodes get only slightly warm.

Chemical Diet Will Prolong Life

THE chemist rather than the dietician should tell us what to eat, prominent chemists insist. A diet consisting half of whatever food the diner wishes, and the other half of a certain fifteen chemical elements, fourteen amino acids, five vitamins and one fatty acid will prolong the average life expectancy seven years, laboratory experiments indicate. The diet will also improve brain functions.

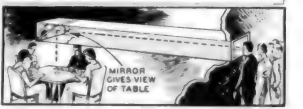
New Clamp Grips Shorts Firmly

OFTEN cabinetmakers are troubled by short pieces of wood which have to be held firmly for working, but which cannot be grasped efficiently by the regular clamp. To their aid comes the inventor of the small but sturdy clamp pictured. It has two jaws which can be quickly applied by a screw and hold short or odd pieces without slipping.



This new small clamp solves cabinetmaker's problem by providing means of holding short or odd-shaped pieces of wood which the regular metal clamp would not grip.

Periscope for Bridge Kabitzers

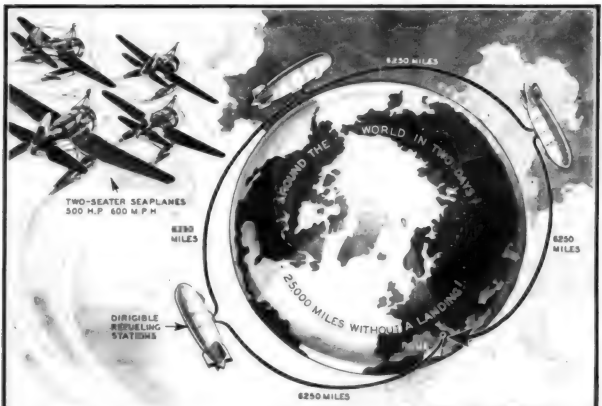


Top picture shows bridge kabitzers at the looking end of the periscope used at a recent international match. Bottom drawing illustrates the optical principle involved.

AT A recent international bridge match the problem of letting people watch the play without interfering with the players was satisfactorily solved by the use of a horizontal periscope with one end suspended over the table and the other fitted through one wall of the room, so that the observers need neither be seen nor heard by the players.

From the observer's standpoint this method of watching a bridge game is more satisfactory than standing by the table, as it permits a view of the cards held in all hands as well as a better look at those played.

Balbo Plans Daring Non-Stop World Flight



Above—Dirigible airplane hoist which Balbo will use. Below—Three dirigibles are needed for four ships.

Balbo's sensational world girdling flight, pictorially represented above, would be undertaken by four two-seater, 500-h.p. seaplanes, designed especially for an altitude of 45,000 ft. Every 6,250 miles the planes would refuel in a giant dirigible.

Smiling Gen. Italo Balbo, above, plans another epic flight to make Italy monarch of the air.

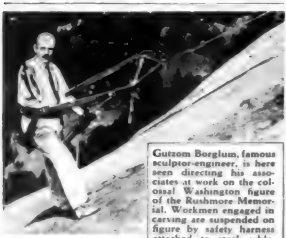
THE first actual world flight of 25,000 miles in two days without a landing is said to be under consideration by Gen. Italo Balbo.

Four seaplanes, designed for flying eight miles above the earth, would accomplish the feat by refueling in four dirigibles, spaced at 6,250-mile intervals. One dirigible would be stationed near the Amazon river, another in the Polynesian islands, and the third near China.

The planes would make each lap in ten hours and be drawn aboard the ships by a suspended hook and hoist, such as is used on U. S. Macon. During each rest period, ships would continue the flight.

Balbo proposes to make the first actual around-the-world flight of 25,000 miles with aid of dirigibles equipped with hooking devices as shown. While planes are refueling, airships would continue flying to maintain non-stop feature of 48-hr. flight.

WORLD'S LARGEST STATUE



Gutzom Borglum, famous sculptor-engineer, is here seen directing his associates at work on the colossal Washington figure of the Rushmore Memorial. Workmen engaged in carving are suspended on figure by safety harness attached to steel cable.

Three titanic figures of the Rushmore memorial come in view of motorists as they emerge from the last tunnel on the new Iron Mountain Highway in the beautiful Black Hills of South Dakota.

THE world regards with awe the stupendous sculptural achievements of the ancient engineers who built the Egyptian Sphinx, the Colossus of Rhodes and the Pyramids, but now it has a new monumental edifice to marvel at which dwarfs the projects of the ancients to almost insignificant proportions.

In the Black Hills of South Dakota a group of engineers, captained by the famous sculptor-engineer, Gutzom Borglum, are carving from a mountain of living granite the figures of Washington, Jefferson and Lincoln, whose faces alone measure sixty feet from chin to cranium top—twice the height of the face of the Sphinx of Gizeh.

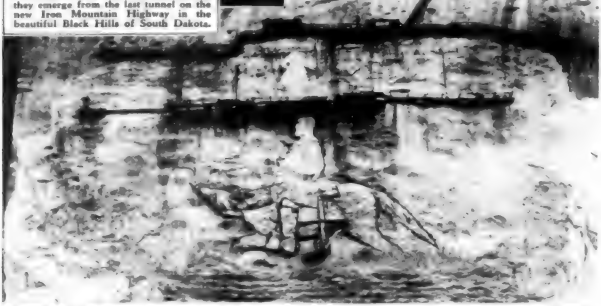
Borglum Explains Engineering Procedure

In a special interview with a MODERN MECHANIX correspondent, Mr. Borglum explained the engineering procedure by which he is attacking his titanic job.

"First," the bronzed and rugged sculptor said, "I prepared a small scale model to get the proper grouping of the three figures. This work was done in a studio with a great plate glass window looking out upon Rushmore.

"Next I made a working model of Washington which was five feet from the chin to the top of his head. This model was taken to the top of Rushmore and used to guide the carving of the great stone head.

"The measurements taken from the working models are multiplied by twelve—an inch on the model being a foot on the statue—and are transferred to the granite



Designed by Borglum, this gigantic figure of General Robert E. Lee carved in bas relief on the living granite of Stone Mountain, Georgia, is another sculptural engineering project which bids fair to endure through centuries and centuries like the Sphinx and the Pyramids. The job, retarded by political dissension, has proceeded to stage shown here. The mounted figure of General Lee was sketched from huge image projected on mountainside by means of a powerful magic lantern.

CARVED IN MOUNTAIN

of Mount Rushmore with the aid of a 30 ft. swinging boom and plumb bob.

"This boom swings horizontally through a graduated arc of 180 degrees. The plumb bob may be suspended from any point upon it. After setting the angle, the distances horizontally outward and vertically downward to the rock are measured by tape. Skillful engineering here is as important to the work as artistic modeling.

"When the work was first begun, I picked the largest sound piece of granite for the figure of Washington," Mr. Borglum continued. "The carving of the rock monument consisted in excavating the excess granite by a process of drilling and blasting which removes successive thin layers without injuring the mountain itself. As little as ten inches of granite can be moved at one time.

Engineers Work in Safety Harness

"This process proceeds to within a few inches of the final surface, and then the finishing is done by a 'broaching' process.

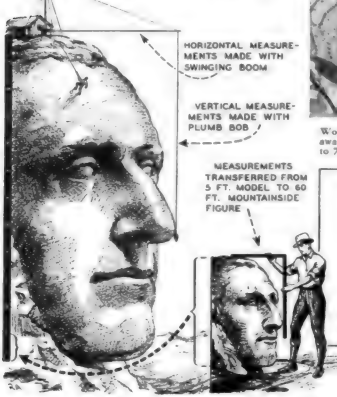
"There are no reserved seats at Rushmore. Workmen when engaged in actual carving are suspended over the edge of the cliff in steel and leather harnesses attached to a ⅞ inch steel cable. These cables are 'paid out' or reeled in by hand winches.

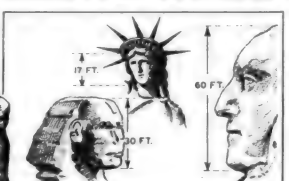
"Usually ten Ingersoll-Rand 'B12 Jackhammer' drills are on the job for the rougher work. When in use these, too, are attached to cables. The drills are ⅞ inch steel finished with cross bits.

(Continued on page 140)

This profile view of the face of Washington shows how Borglum's associates hang suspended in safety harnesses when boring holes for blasting or "broaching" to produce a fine finished surface.

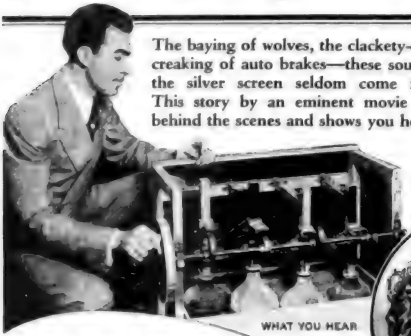
Workers drilling holes for dynamite sticks which blast away the stone to shape facial features. Charges in 67 to 75 holes are set off simultaneously by 110-volt current.





How Rushmore faces compare with Sphinx of Gizeh and Statue of Liberty. Left—drawing illustrates manner of transferring measurements from 5 ft. model to huge mountainside figure.

Behind the SCENES With



The baying of wolves, the clackety-clack of horses' hoofs, the creaking of auto brakes—these sounds which you hear from the silver screen seldom come from their real sources. This story by an eminent movie sound expert takes you behind the scenes and shows you how these noises are faked.

by

MURRAY SPIVAK

Famous Hollywood Sound Director

Murray Spivak operating the "horse's hoof sound effect" machine he utilizes to simulate hoof beats. Turning the crank causes the vacuum plungers to beat on turf, if the scene is a race, or a slab of marble if the scene is a paved city street.

ONE afternoon recently I sat in the scoring room of the movie studio where I am sound director watching a team of horses gallop down a country road. Later in the picture trees swayed in a violent wind, and then brush broke as an actor ran through a forest. But never a sound issued from the talking screen.

At last the reel had been run. "Okey," I said. "Now start her again and turn on the noise."

Then, as we sat in darkness, the sound of hoof-beats, just as I had seen them on the screen, clicked off rythmically. Wind whistled through the swaying trees, and the brush crackled when the actor's foot touched the ground.

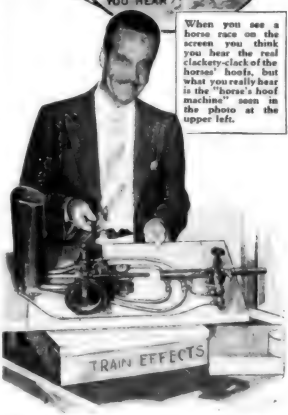
Simple Machines Make Difficult Sounds

Simple toy-like devices that any craftsman could turn out at his workbench had manufactured these artificial sounds—and had manufactured them so realistically that audiences of millions of movie-goers never become aware of the deception.

With these devices we can simulate in sound a sandstorm sweeping across an African village, earthquakes and the eruption of volcanoes, the grunts and squeals of pigs, the whine of an automobile tire, the click of a lock or bolt, footsteps on creaking stairs, rain falling in sheets on soggy ground or sweeping before the wind in a storm.

In fact we can reproduce some noises more quickly and at infinitely less cost and with more fidelity than we can catch the

When you see a horse race on the screen you think you hear the real clackety-clack of the horses' hoofs, but what you really hear is the "horse's hoof machine" seen in the photo at the upper left.



The train sounds you hear from the screen are all produced by this ingenious contrivance. The puffing from the stack is imitated by puffs of air under high pressure released by motor-operated valves. Sound of whistle and escaping steam also issue from this machine.

Movie SOUND FAKERS

The recording of screeching sounds of an automobile skidding around a hazardous bend in a road would prove too dangerous, so sound technicians have devised special machines for the job. Three sounds are mixed—skid of tires, creaking of brakes, and the scream of human voices.

This is the machine you actually hear when you think you hear the skid of auto wheels on the screen. Sandpaper-covered discs turning in opposite directions make skidding noises that send chills up the spine of even the movie men themselves. Bearing down on the upper disc crescendoes the effect.

When a Ford driver blows his horn in a picture, a Ford horn sound issues from the loud speaker behind the screen. Likewise with any other make of car. Above is seen the battery of horns and sirens which produces the sound called for in the scene. Storage battery operates any of them.

original at its source with a delicate microphone. Why wait on a hilltop for thunder to crash across the sky when a sheet of metal, shaken vigorously, serves the purpose better at the studio?

As we work to synchronize the correct sounds with such scenes as the aforementioned, there stands against one wall a machine consisting simply of eight wires radiating from a hub. A handcrank turns the wires, each of which has at the end a four-inch segment bent at right angles to the body of the wire.

Synchronizing Sounds With Picture

On the floor rests a small machine containing four vacuum rubber plungers that beat against dirt. A sound effects technician stands near by, two small branches cut from a shrub in his hands. At his side is the shrub.

As the action unfolds the wires begin to speed through the air until the low moan of wind fills the room. The plungers are then worked up and down. A horse is trot-

Vox Humana Pipe Simulates Moo of Cow, Baying of Wolf, Yelp of Hyena

Cows moo, lions roar, hyenas bark, wolves bay to the moon in the motion picture, but the mooing, the barking, the baying all issue from this vox humana pipe. While the picture is being run through in the scoring room, the operators make the called-for noise, which is synchronized.

ling. And as the technician crushes dried sprigs in his hand, one visualizes heavy boots tramping down the thin underbrush of the forest.

As the picture progressed, several types of wind were manufactured in the dim light of the scoring room. For whistling wind we have devised a second machine consisting of a flat, plate-like screen. This revolves through a single plane and its noises sound like wind cutting around corners or driving through the rigging of the ship—exactly the kind you hear when walking home after dark any gusty spring evening. Its ends cut through the air, whistling as they go, and the onrush of air through the holes in the screen helps provide the sudden gusts.

Sandstorm Terrifies Even Sound Men

By "mixing" these two simple devices, or turning them simultaneously, and by revolving two discs covered with sandpaper against each other, we create in a moment a sandstorm that sends shivers down the back of even the most experienced sound men.

This, however, was a simple storm. The sand merely blew away across the desert. Suppose we huddle in the lee of a building, directly in the path of the storm. Listen! The machines begin to turn, but now I bear

Sounds difficult to manufacture mechanically are recorded from original sources and then imprinted on the sound strip. Here an arctic movie sound expedition is setting up its apparatus to capture noises of seals and crunching ice.

down harder on one of the sandpapered discs.

Sand commences to blow hard against the imaginary wall. By increasing the friction on the sandpaper, I create the sound of the tiny particles being halted in their wild flight by the building that stood in their way.

We merely "build up" the sand part of the storm to make the storm more violent. How much sound we would create in a sand storm for a given scene depends largely on what the eye would see.

If the scene shows sand blowing unhindered across a desert, it will carry less

volume, less "beating," than it would were it striking buildings or tents.

After the sand storm, we turn to the task of producing a rainstorm as one hears it within a closed room. Again the wind machines whistle while a sound man crushes bits of the shrub between his hands. One hears as many as five distinct noises coming from different parts of the room, but they enter the microphone together. Wind, rain, crushed shrubs and the beat of a horse's hoofs in the distance. Stormy noise in a steam-heated room!

With the "horse's hoof sound effects," the only name by which I know the machine, we reproduce the rhythm of horses running 60 miles an hour, or some 20 miles faster than the world's fastest can speed down the back stretch. Here's how and why this works as it does:

Three Machines Sound Like Dozen Horses

One picture showed the heated finish of a race. The camera truck sped 35 miles an hour ahead of the horses, the lens focussed on the forelegs and feet. But the film was turning only a little more than half its usual rate. This produced on the screen the effect of a speed nearly twice that actually achieved.

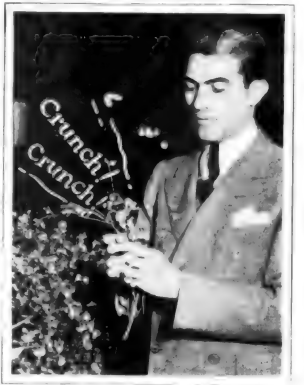
Had the sounds of the hoof beats been recorded at the same time, when reproduced they would have lagged far behind the picture.

With the tiny machines, however, I know we could match any speed desired. So, into the scoring room we carried three of these "mechanical horse hoofs" and there, as the scene unfolded, three assistants turned the cranks and 12 rubber cups beat against dirt in the bottoms of the boxes to represent a dozen snorting horses tearing down a straightaway.

The operator does not need a sense of rhythm, as a series of cams is so set that the cups beat down like a galloping horse. While one machine sounds like a lone horse, the beats of three operating together become indistinct; thus, with three, the operators can "cheat" to represent as many horses as may be shown on the screen.

If the horses run on turf, the rubber cups fall on dirt; if a runaway on a city street

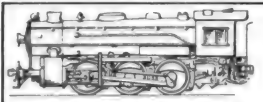
(Continued on page 135)



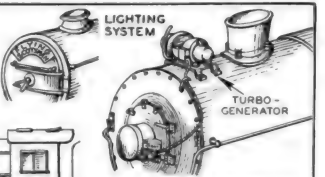
Sound of hunter padding his way through forest or underbrush is simulated by merely crunching dried twigs in perfect synchronism with footfalls of the actor in the scene.

Cameramen and sound technicians on location. Here sound is recorded at same time scene is filmed. New parabolic microphone seen at left focuses on one point, excluding all other sounds.

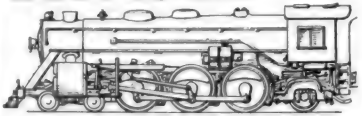
Interesting FACTS About Locomotives



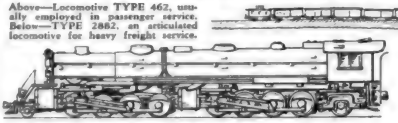
Locomotive TYPE 060, used for switching or yard work. Note there are no leading or trailing trucks.



Power for locomotive lights is furnished by a small generator operated by a small steam turbine usually placed on top of the boiler. English engines like the "Flying Scotsman" run without using headlights.

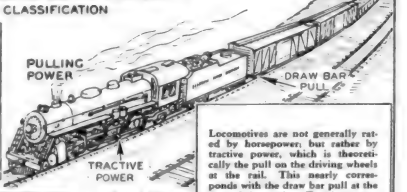


Above—Locomotive TYPE 462, usually employed in passenger service. Below—TYPE 2862, an articulated locomotive for heavy freight service.

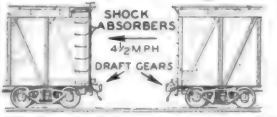


LOCOMOTIVE CLASSIFICATION

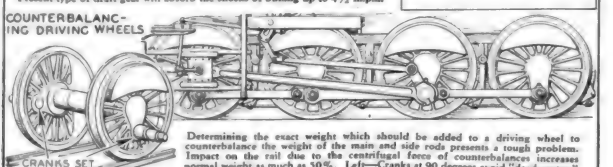
Locomotives are usually classified according to their wheel arrangements, as illustrated in the case of the three types above. The first figure represents the number of wheels in the leading truck, the middle figure (or figures) the number of driving wheels, and the last figure the number of trailing wheels. The tender wheels are not considered. This is known as the Whyte system of classification. These figures are generally inscribed on the engineer's cab, just under the window.



Locomotives are not generally rated by horsepower, but rather by tractive power, which is theoretically the pull on the driving wheels at the rail. This nearly corresponds with the draw bar pull at the rear of the tender. Tractive power is determined from a formula using the diameter of the cylinders, stroke, diameter of driving wheels and steam pressure. Actual draw bar pull at the rear of the tender (which mainly interests transportation officials) is obtained by use of a special car placed directly behind the tender on test runs. With this instrument the amount of freight a locomotive can pull is easily determined by engineers.

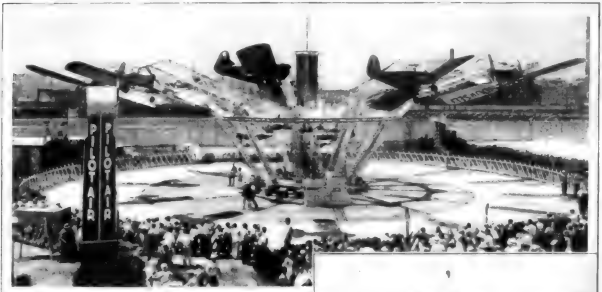


When freight cars are bumped together the shock is taken by a cushioning device known as a draft gear. This device is situated directly back of the coupler and usually consists of friction elements in a steel casing. Present type of draft gear will absorb the shocks of buffing up to 4½ m.p.h.



Determining the exact weight which should be added to a driving wheel to counterbalance the weight of the main and side rods presents a tough problem. Impact on the rail due to the centrifugal force of counterbalances increases normal weight as much as 50%. Left—Cranks at 90 degrees avoid "dead center."

Pilot Your Own Plane and Never Crash!



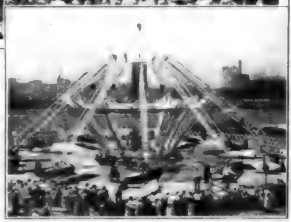
Each pilot can dive, bank, and climb a standard airplane without previous training, on the machine shown above.

NOVICES can pilot airplanes without any training on a new amusement park device. The untrained pilot can dive, climb, and bank at will.

He is limited, however, to a small circular course by the arms of the machine which holds several planes. The airplanes are standard ships and are controlled by regulation "joy sticks." Each plane is run by its own three horsepower motor.

Counterweights on the arms of the revolving machine take some of the load off the wings of the airplanes.

A central power plane starts the machine and its twelve planes. When the planes leave the ground and attain a speed of ten miles an hour, the central plant is shut off and the individual motors in the planes started.



Untrained pilots are shown in photo above ready to take off. Planes have 3 h.p. motors and can go up to 40 feet.

The pilots are then free to operate their planes until the power is shut off. The machine was perfected after five years of experimenting. It was used for the first time at the Century of Progress in Chicago.

Artificial Fever Machine Designed by Scientists to Fight Dread Disease

The above machine produces artificial fever to cure disease.

MAN-MADE fever has been developed to fight disease. Fevers are produced artificially in a newly invented machine.

The machine resembles the "artificial lung" used in cases of infantile paralysis of the chest. The patient's entire body, except the head, is enclosed by the machine and the proper temperature is produced by means of electrical heaters.

The crisis of certain diseases can be passed successfully if a high fever can be induced. Experiments with the artificial fever machine are being conducted in an effort to combat the spread of sleeping sickness.

Instruments on the machine provide for accurate regulation of temperature and a constant record of the patient's fever is recorded automatically. The new machine was demonstrated recently in Chicago at the American Congress of Physical Therapy.

Strategy of New U. S. Aerial

Aerial inspectors of Uncle Sam's Customs Bureau photographed in pursuit of a sky smuggler attempting to cross Texas-Mexican border with a cargo of narcotics. Note "diamond back rattler" camouflaging on wings and fuselage.

by **RALPH SPENCER**

Customs Bureau Men, perplexed by the flood of narcotics, precious stones and undesirable aliens pouring across our borders, have now traced the contraband goods to their sources—"sky smugglers." How Uncle Sam's new aerial border patrolmen hunt down these outlaws with ingenious aerial strategy is told in this story of gripping aeronautical adventure.

FIVE thousand feet above the arid Texas-Mexican border an airplane speeds on a secret, illicit mission. Traveling well over 150 miles per hour the craft maintains its speed until about three miles west of Poteet, Texas.

At this point the pilot, evidently intending to land, slants the nose of his ship earthward, losing about a thousand feet. But suddenly another plane swoops down out of the heavens, diving straight at the first plane. On its tail is the insignia of the U. S. Customs bureau.

Immediately the chase is on. There begins a series of aerial maneuvers closely resembling the "hide and seek" combat maneuvers of the World War.

The pilot of the pursued plane puts his ship through a series of thrilling maneuvers. Diving and twisting and spinning, he finally succeeds in breaking away from the plane with Uncle Sam's insignia on its tail and gaining a strategic point in the sky.

But not for long. Within ten minutes the pursuit ship, armed with a machine gun and manned by two men in uniform, achieves a position alongside.

Then, pointing to the insignia on his plane the pilot of the government ship signals the pilot of the pursued plane to make an immediate landing. This order is obeyed, and a few minutes later both planes are on the ground.

Thus finally, after a sensational 200-mile chase, and without a single shot being fired, a "sky smuggler" is caught, forced to land and arrested by aerial patrolmen of the United States Customs Bureau.

Episodes like this are enacted daily along both the Canadian and Mexican border since Uncle Sam launched, about a year ago, his latest system for fighting the sky

Above is a remarkable aerial photo showing Customs plane hedge hopping over sage brush terrain, which gives you an idea how difficult it is for sky smugglers to spot pursuers about to pounce on them and make an aerial arrest.

Patrol Traps "Sky Smugglers"

Two Customs planes waiting in ambush to trap a sky smuggler. When outlaw ship is forced to earth mounted Customs men, working with flyers, dash out on landing field and make arrests before escape can be effected.

smuggler. So quietly was the system set in operation that, until the other day, nothing had leaked out from official quarters concerning the new patrol.

Smuggling through the air has been greatly on the increase during the past few years. Liquor, undesirable aliens, narcotics, precious stones, watch movements, and merchandise of all sorts have been brought in on a large scale across the Mexican, Canadian and maritime borders.

Ordinarily, it has been learned, the pilot of a smuggling plane averages between $100 to $200 for a single trip. Assuming that he were smuggling high-grade tobacco into

Below—Two aerial patrolmen taking off in pursuit of a smuggler. Note Customs Bureau insignia on tail of plane. Right—Artist's drawing depicts patrolmen making arrest.

A squadron of customs planes warming preparatory to going on patrol. Speedy Curtiss-Falcon ships carrying experienced pilot and "mounted inspector" comprise a crew. Most of the ships are confiscated from smugglers who are thus being fought and captured with their own weapons.

Bane of the sky smuggling racketeers are these four members of Customs Aviation Unit stationed at San Antonio, Texas. Left to right: Connor, Hayes, Duell and Hannicutt.

Border patrol revenue men making camp while on the trail of a smuggling ring. These mounties always work in co-operation with flyers to bring desperadoes to justice.

Florida from Cuba, it is obvious that he could earn a handsome sum for only a couple of days' work.

More specifically, it's only about 90 miles from Havana to Key West, Fla. A one-way trip would consume only an hour at most, and the round trip, only two hours. In an ordinary two-seater plane he could easily carry two bales of tobacco, each weighing 100 pounds. If he could average 8200 for the two-hour trip he certainly needn't starve.

Smuggling by airplane cannot be coped with in the same manner as smuggling in vessels and other vehicles because the aircraft cross the border at high altitude and proceed at a swift rate of speed to hidden landing fields in the interior of the country far removed from ports of entry of Customs stations. Experience has shown that the only successful method of combatting airplane smuggling is for the customs Service to equip itself with aircraft and competent pilots and pursue the smugglers through the air.

Fortunately there have long been available in the Customs Service a number of officers who are well qualified as pilots and who hold proper licenses from the Department of Commerce. Working shoulder to shoulder with the pilots are special officers, wearing the official olive drab uniform and designated on the payroll as "Customs officers at large" in order that they may be authorized to operate in any Customs collection district into which they may pursue and seize an airplane.

Mounted Inspectors Date Back to Teddy Roosevelt

Along the Mexican border these men are usually spoken of as "mounted inspectors," a term that goes clear back to the romantic days of Teddy Roosevelt's mounted rough riders.

Thrills and drama are commonplace in the lives of the pilots and special officers. They deal constantly with men who know no law. While they are supposed to have regular working hours, they are often called upon, when on an assignment, to work night and day until it is finished.

In a real sense they are secret police for they use under-cover methods at all times. That such methods are efficient is indicated by the fact that thus far some 67 planes have been seized by the Customs Service for smuggling and other violations.

(Continued on page 132)

Enter this Workshop Contest! $150 IN CASH PRIZES

Shown above is a skull and cross bones which has been cleverly adapted as a holder for cigarettes and matches. The builder made this by taking a real skull, filling up the cracks, eye sockets and other gruesome openings with plastic wood. The thing was then sanded, and a plaster-of-Paris mold made, from which this cast was taken. Bronzing was the next step. When this was brushed off, white shellac and the appropriate inscriptions were added. Novelty is the feature your holder should possess to win a prize.

Novelty is shown here in a cigarette holder made to look like a book—cover design in beads.

Above and to the left are shown two types of cigarette holders which might be entered in such a contest as is described. Above, a shoe has been specially treated and preserved with suitable varnishes. The opening at the top has been plugged with a wooden receptacle for the smokes, while a match box reposes fittingly in the toe. Left: A cigarette holder which automatically delivers a cigarette. It is not necessary to make expensive holders to enter the contest.

ALL aboard! There is still time for you to get your entry in on the novel contest announced in last month's MODERN MECHANIX AND INVENTIONS! For the benefit of those who missed the first announcement we repeat:

We are looking for the most practical and at the same time the most novel cigarette holder we can get so that plans can be run in the magazine. To call out the ingenuity of M-M readers the editors are offering $150 in cash prizes to be awarded as follows shortly after December 1st, 1933: First prize, $75; second prize, $40; third prize $25; and ten fourth prizes of $1 each.

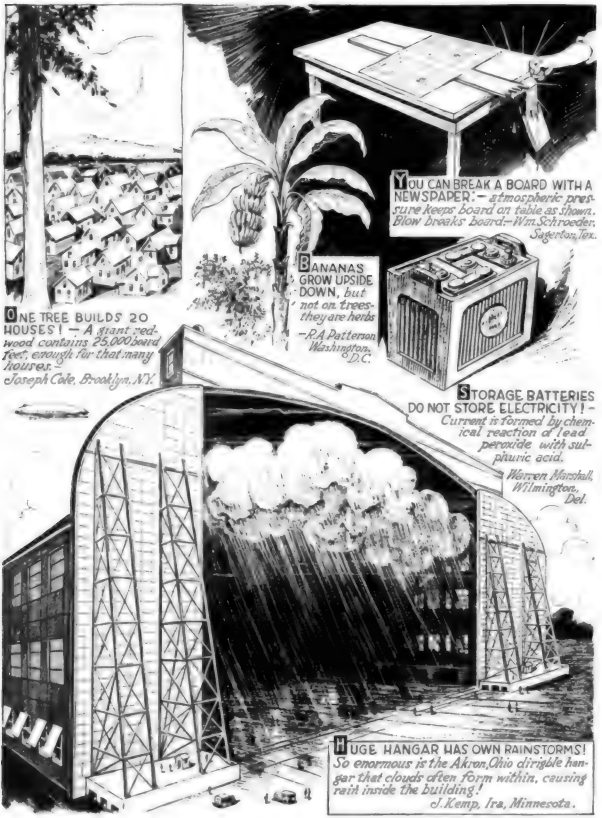
The entries, which must be submitted to Cigarette Holder Contest Editor, Care MODERN MECHANIX AND INVENTIONS, 529 South 7th St., Minneapolis, Minn., must be sent postpaid to this office postmarked not later than December 1st, 1933.

Judging of the entries will begin on that day, and the awards will be made as soon thereafter as possible. Actual cigarette holders must be submitted so that we may dissect the prize-winners and make photographs from which an article may be illustrated. Do not send plans or drawings. No models will be returned. The decision of the judges will be considered final, and in event of a tie, duplicate prizes will be awarded. Employees of this publication and their families, of course, are not eligible to compete.

That's all there is to it! No strings, no muss or fuss or red tape! Somebody is going to have $75 first prize money for merely going to the workbench and concocting the most novel, rational and practical cigarette holder he can imagine. Twelve other entrants will share in the prize money—so there is ample chance for you to win.

As a hint to the type of thing that will stand the best chance of winning, bear in mind that the judges will consider the entries on the following points, in order as named: Originality of conception, practicability (as opposed to the grotesque or distastefully bizarre), workmanship, and lastly, ease of construction.

Strange Facts of NATURE



ONE TREE BUILDS 20 HOUSES! — *A giant redwood contains 25,000 board feet, enough for that many houses.* — *Joseph Cole, Brooklyn, N.Y.*

BANANAS GROW UPSIDE DOWN, *but not on trees—they are herbs* — *R.A. Patterson, Washington, D.C.*

YOU CAN BREAK A BOARD WITH A NEWSPAPER: — *atmospheric pressure keeps board on table as shown. Blow breaks board.* — *Wm. Schroeder, Sagerton, Tex.*

STORAGE BATTERIES DO NOT STORE ELECTRICITY! — *Current is formed by chemical reaction of lead peroxide with sulphuric acid.* — *Warren Marshall, Wilmington, Del.*

HUGE HANGAR HAS OWN RAINSTORMS! *So enormous is the Akron, Ohio dirigible hangar that clouds often form within, causing rain inside the building!* — *J. Kemp, Ira, Minnesota.*

On the surface many odd facts that seem to defy natural law are easily understandable when the physical conditions back of the phenomena are known. Here are two pages illustrating facts that appear fallacious at a casual glance, but which are quite natural when all conditions surrounding them are considered. If you want to know the explanation of these scientific oddities consult page 24, and remember Nic Sprank pays $1 for oddities acceptable to M-M editors.

Oddities of Science

by NIC SPRANK

These strange facts of science call to our attention a few of the things which on every hand refute some of our accepted notions about nature. ONE DOLLAR will be paid you by Nic Sprank for every Oddity he considers good enough to make this page. Try your luck! Send in something new—dont re-hash the obvious, and your chances of cadging a dollar bill are as good as the next man's. Address Nic Sprank, care Modern Mechanix, 529 S. 7th St., Minneapolis, Minn.

Comical Masks Guard Speed Demons From Face Wounds

Though grotesque in appearance, these motorcycle racers suffer no facial injuries from flying cinders because they are wearing face guards. The masks are moulded to fit.

DAREDEVIL speed demons of the Metropolitan Racing Association of New York look more like hobgoblins than human beings when they whizz around the tracks.

What accounts for their grotesque appearance is a new false-face mask worn to protect riders from cinders, which are hurled through the air at a terrific force during races.

The masks are applied while the riders are spluttering for the get-away. They are dipped in water, then placed over the face. When dry, they shrink to form a perfect fit for the physiognomy.

Children Grow Faster in Fall

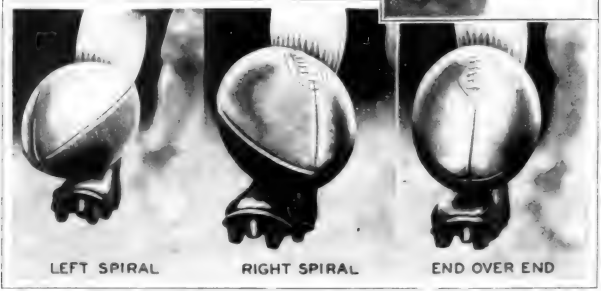
FOR some unknown reason school children grow fastest in September and October, only moderately during the winter and summer and least of all in the spring, according to statistics. Some difference in diet, such as that between more vegetables and other fresh foods in the summer and fewer of these foods in winter and spring, may be the explanation of the cases.

Fast Action Camera Shows You the Fundamentals of Football Kicking

SPECTATORS who follow with keen enthusiasm the battles of mighty football squads, but who are little aware of the mechanics of the game, will be enlightened by a study of the accompanying photos illustrating the kicking technique as practiced by winners.

The proper grip for punting or drop-kicking is seen at the right. After receiving the ball, the kicker adjusts his hands so that the ball drops precisely to meet the upswinging foot.

To make the ball to bounce up in a left spiral after it hits the ground, the kicker causes the ball to hit his instep slightly on the left side of the foot. When a right spiral is desired, the ball hits the instep on the outside, or right side, of the foot. For the end over end kick, the ball and shoe must meet in line. This is a low, quick surprise kick over the head of the safety man.



Pictured here are positions at which the upswinging foot meets the ball to impart various spiral motions to the pigskin.

Latest for Duck Hunters—Boots, Hunting Suit, Blind in One

A COMBINATION blind, boots and hunting suit is the latest paraphernalia perfected for the use and enjoyment of duck hunters. Made of light-weight rubber, it consists of a pair of trousers that reach to the arm-pits, and a top piece vulcanized to the trouser waist with the opposite rim attached to a tube, like an auto tube.

The tube floats on the surface of the water, and when the hunter crouches down he is invisible except from directly above. He can peep over the rim until he sees the ducks approaching within easy range, then quickly rise and fire.

The high trousers are supported by short suspenders, and the whole suit is made perfectly watertight, so that the wearer will remain dry no matter how far he may wade out. The "skirt," with its floating rim, is made full enough so that it will not interfere with the hunter's use of his gun.

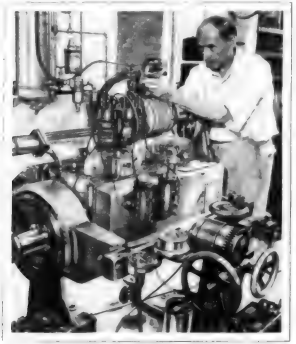
An unusual rig designed for duck hunters. The rim, which the wearer is holding up with his hands, is an inflated tube supporting an inverted "skirt" which serves as a blind.

Motor Has Two Pistons to Cylinder

A VALVELESS motor with two piston rods for each of its eight cylinders is attracting the attention of automotive engineers. The pistons, operating from opposite ends of the cylinders, compress the charge in the center, where it is fired.

One piston opens the intake port, while the other opens the exhaust. Practically vibrationless, the first model made—weighing 425 pounds—developed 268 h. p., and drove a car 35 miles on a gallon of gasoline.

The motor will operate at from 50 to 6,000 revolutions per minute. On the basis of initial tests, it is expected to build a 1,100 h.p. airplane motor with a total weight of 960 pounds. The motor was designed by H. C. Colburn and built by C. B. Klein.



This valveless motor with two piston rods to each of its eight cylinders weighs 425 pounds and develops 268 h.p.

Bottles Keep Car Battery Watered

AN AUTOMATIC battery filler now being marketed attaches to the dash of your car and keeps your battery properly watered at all times, eliminating the necessity of constantly watching over it. Water for each of the three cells is contained in a bottle, as shown, which connects to the cells by means of a concealed hose. A slit in the cabinet front shows amount of water in bottles at all times.

Water from these bottles on dash is fed to battery cells through rubber hose, keeping battery always full.

Glass FURNITURE One of

Electricity is harnessed to operate this can opener. Place the can on the revolving platform and the lid comes off neatly in two seconds.

Boon to manicuriats is this motorized buffer and nail cleaner having accessories for all manicuring tasks.

New mechanical tea brewing pot now on the market manufactures the beverage uniformly brewed and free from impurities. An automatic "time cup" is a feature. This has a timing vent which allows hot water to escape into the pot in three, four or five minutes, as desired. When time cup is empty an air float lifts the tea cylinder up out of the water, completing the steeping.

AUTOMATIC
TEA
MAKER

Waste motion by the housewife is reduced to an absolute minimum with compact, space-saving kitchen cabinet that includes nearly all kitchen and basement appliances: an automatic heat control gas range; an extra long sink; a gas refrigerator; a water heater capable of furnishing hot water for a seven-room home; numerous storage cupboards; vents in the top of the cabinet heat the kitchen in winter and cool it in summer. All units are interchangeable to fit space.

New Household Appliances

BAR AND RADIO IN ONE

There's plenty of entertainment in this cabinet, for it houses both a radio and compartments for cocktail shakers and glasses as well as other party appurtenances. Displayed at a recent British industries exhibit, the bar-radio cabinet won wide popularity among apartment dwellers.

HOME BARETTE

All conveniences for quiet home drinking are found in this portable miniature bar.

GLASS FURNITURE

HOSTESS TRAY

What more appropriate than that glass walled houses now winning wide popularity should be furnished with glass furniture? Above is seen a dressing table recently displayed at a British Furniture Exhibit which represents the last word in modernism. Chromium plated steel is the framework of the new furniture, providing an exceptionally sturdy article. At right—Ideal for hostess is this hospitality tray consisting of a toaster, breadboard and trimming knife, and six dishes for sandwich delicacies. M-M editors will give you names and addresses of manufacturers.

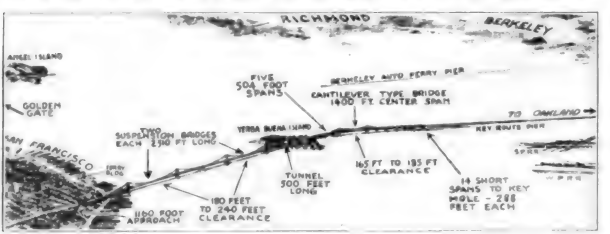
GALAXY of Huge Bridges

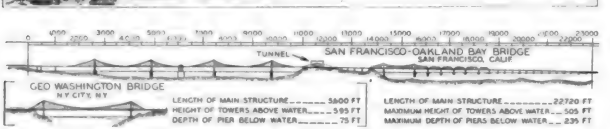
Aerial view of San Francisco-Oakland harbor, looking inland toward the Golden Gate. This shows how the Golden Gate bridge will look when finally completed, and shows the route of the huge new San Francisco-Oakland bridge, which will be called the "Bay Bridge." These will be the largest bridges in the world when completed and ready for use.

CALIFORNIA'S native sons boast of many things, such as invigorating climate, variegated scenery, soil fertility, and now they are to have another item added to their list—a bridge with the world's largest suspension span.

This will be the Golden Gate suspension bridge, now under construction, and but part of a galaxy of huge bridges which will facilitate the movement of vehicular traffic in the western seaports.

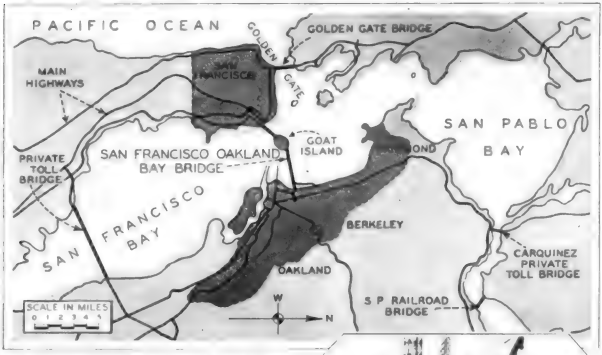
Crossing San Francisco Bay to connect 'Frisco with Oakland, as illustrated in the drawing above, another bridge will form an





Costing more than $108,000,000 the Oakland-San Francisco bridge will be flung across the Bay along the route illustrated in artist's drawing above. Its eight and a half mile length eliminates car ferry crossings and 30-mile trek by land. In drawing below graphically presented are outstanding features of the structure. Tallest liners may pass beneath the bridge.

for San Francisco-Oakland



The San Francisco-Oakland Bay galaxy of bridges is shown in this map. The Golden Gate bridge, huge suspension type, will span the opening of the harbor. The existing private toll bridge is also shown, and also the route of the new 8-mile Bay bridge, across Goat Island.

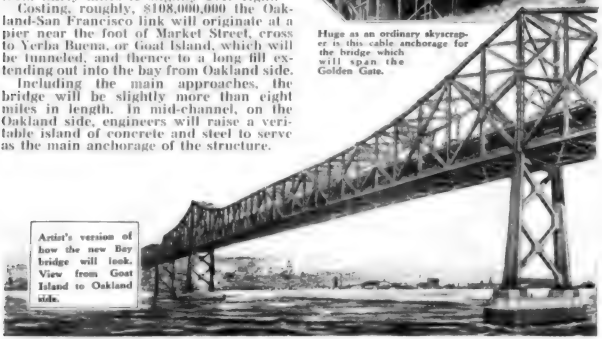
automobile and train straightaway down the Pacific Coast—the San Francisco-Oakland "Bay Bridge."

Heretofore autos and trains have been compelled to cross the bay by ferry, or take a circuitous 30 mile trek skirting the water's edge. The bridge cuts the journey from thirty miles to slightly over eight.

Costing, roughly, $108,000,000 the Oakland-San Francisco link will originate at a pier near the foot of Market Street, cross to Yerba Buena, or Goat Island, which will be tunneled, and thence to a long fill extending out into the bay from Oakland side.

Including the main approaches, the bridge will be slightly more than eight miles in length. In mid-channel, on the Oakland side, engineers will raise a veritable island of concrete and steel to serve as the main anchorage of the structure.

Huge as an ordinary skyscraper is this cable anchorage for the bridge which will span the Golden Gate.



Artist's version of how the new Bay bridge will look. View from Goat Island to Oakland side.

Walking Bridges to Carry Caissons Is Latest Construction Suggestion

Enormous in its size and daring in its execution is this Golden Gate bridge, now building at San Francisco. This is a view looking west through the Golden Gate and shows how the bridge will look. So huge is it that more wind sway allowance has been set at 13 feet!

Massive proportion of the structure may be perceived from the following interesting features of the bridge: The two main cables of the bridge will be over three feet in diameter, 7,660 feet long, and they will be woven of 27,572 separate strands of wire.

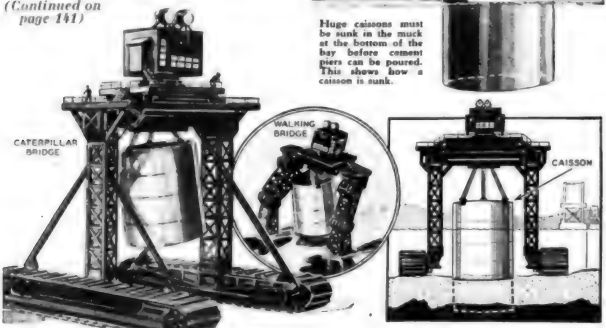
The largest of the huge cantilever spans penetrates 256 feet below the surface of the water, the equivalent in height of a 23-story building, and towers 300 feet above water.

To resist wind and earth forces the bridge is being built to allow a sway of 13 feet, and yet sustain a peak load capacity of 430,000,000 pounds.

New Yorkers who view the George Washington Bridge with awe are given something really huge to talk about when it is

(Continued on page 141)

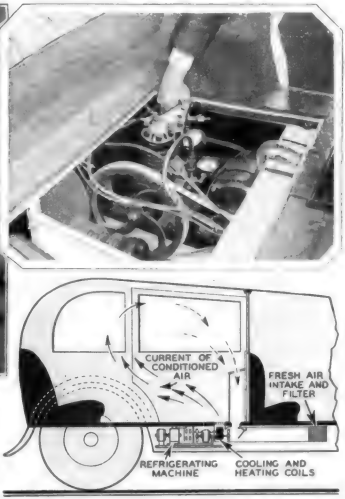
Huge caissons must be sunk in the muck at the bottom of the bay before cement piers can be poured. This shows how a caisson is sunk.



One engineer's suggestion for the solution of the problem of sinking caissons is depicted here in this picture of a "walking bridge." Definite placement of caissons has always been an engineering bugaboo when they are floated over a spot and sunk. Especially is this true in harbors where there are tide rips, or in rivers where strong currents are found. While the walking version may be impracticable, a caterpillar footed bridge is certainly plausible and has many merits from a constructional standpoint.

AIR Conditioner Improves Auto Comfort

Above is an interior view of the air-conditioned automobile, showing the grills through which cooled or heated air is forced into the car. John A. Sargent, the inventor, is holding a blowing fan above the cabinet which houses the heating and cooling coils.



The refrigeration unit of the automobile air conditioner is shown in the photo at the top. Location of the air ducts and arrangement of the conditioner is shown in the drawing.

FOLLOWING the air-conditioned theater, train and office building comes the invention of an air conditioner for automobiles.

The new air filtering unit keeps the interior of an automobile at a comfortable temperature in summer or winter and maintains proper humidity in all weather.

Installed in an experimental car the invention was successfully demonstrated on a hot day with the windows tightly closed. The occupants of the car were comfortably cool and untroubled by the humidity, noise and traffic fumes of New York's streets.

The air conditioner was invented by John Allston Sargent. The entire apparatus can be slung beneath the floorboards or in the case of limousines and sedans the heating and cooling coils can be placed under the front seat.

Fresh air is sucked through an air duct in the top and underneath the car. It is filtered and conditioned and blown into the car. The refrigerator unit and the fans are driven by a generator which is operated by the automobile engine.

This arrangement permits the unit to run at the correct speed no matter how fast the car is traveling. The heating coils are supplied with hot water from the water jacket of the engine. The air conditioner is expected to be adopted by many bus and taxi companies to meet the competition of automatic temperature control in railroad coaches.

Midget Drill Press for Workbench

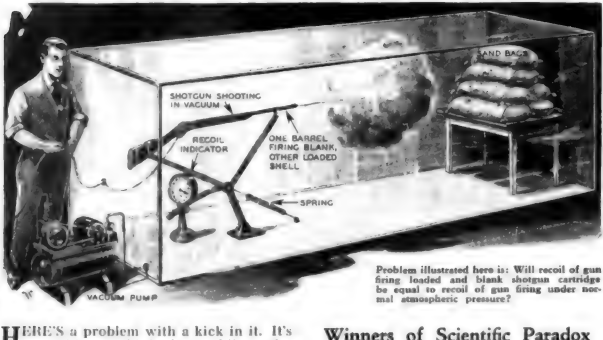
ONE of the handiest additions to any workbench is the midget drill press seen in the one pictured at the right. To the man who makes things it is almost indispensable.

This particular press is inexpensive — and has a wide range of uses, making it ideal for small shops.

Small drill press is big aid to the man who makes things.

It takes all sizes of round shank drills up to 9/32" and the greatest distance from the chuck to the table is 5". The table may be swung aside for larger pieces.

$25 CASH PRIZES *for* BEST ANSWERS to *This Shotgun* RECOIL *Problem*



Problem illustrated here is: Will recoil of gun firing loaded and blank shotgun cartridge be equal to recoil of gun firing under normal atmospheric pressure?

HERE'S a problem with a kick in it. It's something to think about while you're drawing a bead on a squadron of ducks winging their course across a gray autumnal sky or taking off in a hurry from the surface of the lake surrounding your blind.

No doubt at such moments your thoughts will be elsewhere but no doubt, also, your right shoulder will receive quite a jolt when you bear down on the trigger. And that's what the problem deals with—the recoil of a shotgun, one firing under normal atmospheric conditions, and another firing in a vacuum.

Now you M-M fans who've had some experience with shotguns know that when you load a 10-gauge shotgun with buckshot and add "just a leetle pinch of powder for "b'ar" there is a lot of kick in the butt of the old smokewagon—a lot. You know also that when you fire a similar shell loaded with the same amount of powder, but powder only, held in place by a very tight wad, you don't get much of a kick.

Here's where the problematic element comes in. Suppose we rigged up an indicator to measure the respective kick of the blank and loaded shells. Watching the recoil indicator, we found that the blank shell registered one unit, the loaded shell 10 units. By this measurement we are able to get a comparison between the recoils of the loaded and blank shells.

Now keeping your supposing apparatus functioning, suppose we loaded a double-barrel shotgun with a blank shell in one barrel and a loaded shell in the other, then mounted the gun on the measuring in-

(Continued on page 122)

Winners of Scientific Paradox Problem Contest

THE October issue of MODERN MECHANIX AND INVENTIONS set forth a group of three Scientific Paradox Problems to enable readers to test their observational faculties.

Hundreds upon hundreds of contestants who have submitted entries will recall that the problems were: (1) The Stratosphere Problem; (2) The Sound Concussion Problem; and (3) The Train Problem.

To L. B. Hallman, Jr., 733 S. Court St., Montgomery, Ala., goes the first prize of $10 for submitting the clearest and most accurate answers. Second prize of $5 goes to Anthony H. Land, 222 McDowell Road, Lexington, Ky. Four third prizes of $2.50 each go to Warren E. Wiede, 1132 S. Mill St., New Castle Pa., Carl H. Marsh, Ada, Oklahoma, Ralph M. Race, of Frostberg, Md., and 17-year-old Alvin E. Robinson, of San Antonio, Texas.

Here is Mr. Hallman's prize winning letter:

No. 1 The Stratosphere Problem

Why is our sky blue and the stratosphere sky black?

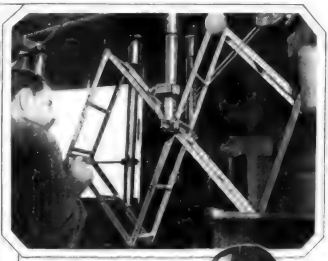
The answer lies simply in the very small number of dust particles in the higher altitudes of the stratosphere. The color of the atmosphere near the earth is caused by the reflecting and scattering of sunlight by millions of tiny particles of dust and moisture floating around. The blue component is scattered or reflected most effectively and, for this reason, the sky appears blue.

In the stratosphere, however, there are

(Continued on page 137)

Camera Sculptures FACES from Subjects

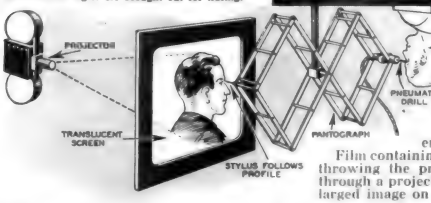
In making busts only five minutes of subject's time is required, during which he sits in chair while rotating camera makes 400 still shots bringing out the head in sharp profiles.



Sculptor tracing image projected on translucent screen, motions being transmitted to drill on pantograph arm.

Few frames of 400 made at sitting. Note how profile views from various angles are brought out for tracing.

Above — Sculptor W. F. Engelman, inventor, putting finishing touches on bust of the late Knute Rockne. At right — Mechanism of the machine. Artist follows profile on the screen, while drill carves plaster bust to likeness of subject.



THE machine has at last invaded the world of art. An amazing new mechanism recently devised combines the principles of the movie camera and the pantograph to turn out plaster busts just as an ordinary camera makes photographic portraits.

Making the bust requires a sitting of only five minutes on the part of the subject. During this time 400 still photographs are made from as many angles by a rotating camera, as illustrated above.

Film containing these 400 pictures, each throwing the profile into relief, is run through a projector which throws the enlarged image on a translucent screen.

Each of these pictures is traced along the profile with a stylus attached to the arm of a huge pantograph, to whose other end is attached a rapidly rotating pneumatic drill cutting out the plaster block.

Each of the 400 pictures is traced out in this manner till at last an accurate likeness of the subject has been completed. As a final touch the tiny ridges between cuts are smoothed out, leaving the bust ready to be cast in bronze.

HUNTING Down ANIMAL

Human cunning is pitted against animal cunning in the continual battle the government hunters wage against killer wolves and mountain lions.

by **JAMES NEVIN MILLER**

Unexpected rewards sometimes greet the government animal hunter. Here, while digging up a den, a mother coyote and two potential killers were easily bagged.

"IF YOU are sent after him bring him in. Use traps, rifles, or poison meat if you have to, but bring him in."

This square-jawed sentence is spoken to government sleuths of the U. S. Department of Agriculture when they set out to hunt down the notorious killers of the animal world. They poison the treacherous coyote, trap the wary wolf and shoot down the meat-hungry mountain lion and bob-cat.

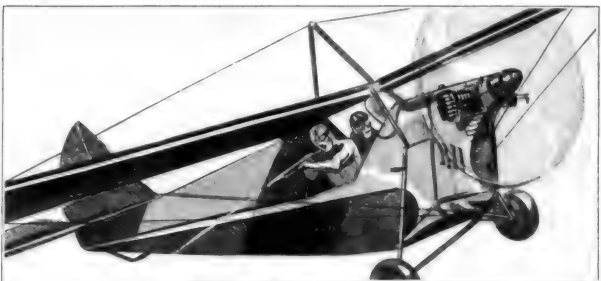
Every year these animal slayers levy a heavy toll on the cattle herds of western ranchers. A wolf or a mountain lion, the government's biological survey indicates, will slaughter about $1,000 worth of live stock a year, a coyote and bob-cat $50 worth, a bear about $500 worth. One single renegade wolf was estimated to have killed $25,000 worth of cattle before it was shot.

Perhaps the most notorious killer ever known was the Custer wolf. He was accorded the honor of being the master slayer of the Northwest. The day he was bagged by a government hunter the telephone and telegraph lines in the region he infested buzzed with more excitement than any time since the armistice was signed.

For nine years this wolf lived as an outlaw—the cruelest, the most cunning, the most daring murderer the range country

A bob-cat killer whose murderous career is just about to end. He has been caught in a trap and in a few moments will be dispatched with a rifle. Inset— A mountain lion, one of arch criminals against whom government is waging war.

OUTLAWS OF THE WEST



Hunting down renegade wolves from the air is a new sport fast winning wide popularity in the West. With a heavy bounty on the head of the animal killers, hunters find it profitable to purchase light planes and scour the forested countryside for their prey.

Trappers and hunters of the Western range states are reaping huge profits bagging predatory animals. Here is seen a week's catch of coyotes, bob-cats, and large mountain lions.

had ever known. No hunter could ever get near him. Here tonight, tomorrow night he devastated a range half a hundred miles away.

He loped through every kind of danger and spurned them all. He sniffed at the subtlest poison and passed it by. The most adroitly concealed trap was as clear to him as a mirror in the sunshine. Old hunters, unerring shots, drew the bead on him and saw him glide away unharmed.

The price on his head was $500. Bounty hunters sought him for profit. Sportsmen put forth every device to slay him for reputation's sake. And still the old renegade went unscathed about his work of destruction.

Finally after stockmen, old-time trappers, and sportsmen hunters had given up the quest, Uncle Sam's Biological Survey Department was called upon and told to "bring him in." H. P. Williams, one of the bureau's best hunters, was assigned to the hunt.

(Continued on page 116)

The pelt of the notorious Custer wolf, an outlaw which ravaged the western cattle region killing $25,000 worth of cattle before it was felled by a Biological Survey hunter.

Whistling Beacons Mark Airfield for Blind Landings

The sonic marker beacon, shown above, for blind landings at airports has three 3000-cycle, compressed air operated, whistles mounted in each megaphone.

Pilots judge length of the field in fog by "dead" sound spot between whistling boundary beacons, as shown above.

Jumping Sand Makes Sandpaper

MILLIONS of sand particles are shot like bullets into their paper glue bed in the newest method of manufacturing sandpaper. Sand particles land on the paper with their sharp ends sticking up like soldiers' bayonets. Formerly sandpaper has been made with the sand spread haphazard, blunt sides mixed with sharp points. Sand is now spread on a moving belt passing through an electrostatic field of 20,000 to 75,000 volts which shoots sand across an inch space to a belt carrying glue-coated paper.

HIGH pitched whistles to designate boundaries of an airport make it possible for a pilot to make a blind landing, recent experiments have shown.

The newly designed whistles, called sonic marker beacons, send out fan shaped beams of sound by means of which the aviator can determine definitely the length of the airfield. The pilot, guided to the airport by a radio beacon, selects an altitude of 2,000 feet and within 500 feet of the boundary line picks up the beacon sound with special listening equipment.

Sound dies away 500 feet inside each end of the field, indicating its length.

Tall Periscope Aids Golfers

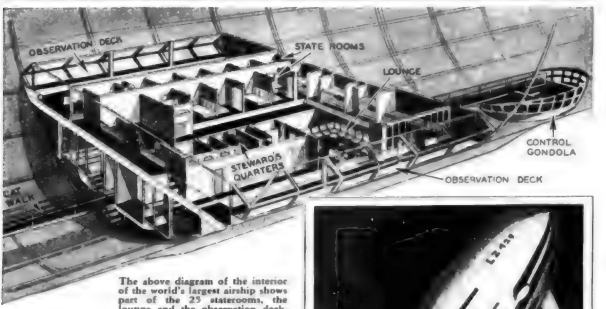
A NOVEL "sky-scraper" periscope shows golfers the blind fairway at the third hole at the Aberoovey golf course in Wales.

The unusual periscope is 30 feet tall. At the third hole of the course the fairway rises so abruptly from the driving tee that golfers can not see the green even though the hole is only 165 yards long. By peering through the periscope, waiting golfers can see in what direction to drive and also note when the putting green is clear.

The periscope is a hollow wood tube fastened to a pole. The top of the instrument is covered with a gabled roof to protect it from rain.

This unusual periscope reveals blind fairway to golfers.

Super Zep is 175 Feet Longer Than Akron



The above diagram of the interior of the world's largest airship shows part of the 25 staterooms, the lounge and the observation deck.

GERMANY'S new super zeppelin, the L. Z. 129, will be the largest airship in the world, outranking the present "Queen of the Air," the U. S. Navy's Akron, by 175 ft.

The giant airship, nearing completion at Friedrichshafen, will be approximately 812 feet long and will join the present "Graf Zeppelin" in trans-Atlantic commercial voyages. The L. Z. 129 will have 25 comfortable staterooms with hot and cold running water, a dining room seating 38 persons, and an observation deck with glass panels through which the passengers can view the earth below.

An unusual feature of the new zeppelin is the construction of the gondola and passenger quarters directly within the framework of the ship, eliminating the usual control car attached to the framework. Kitchen and lounge also are included in equipment.

Germany's new super zeppelin, the L. Z. 129, shown in the above drawing, will be 812 feet long. It will be used in trans-Atlantic commerce. The dining room will seat 38 persons and staterooms will have hot and cold water.

Photo shows start of test run with alcohol-gasoline fuel recommended as a means of reducing the farm surplus.

Urge Alcohol Gas for Farm Relief

FOR economic and technical reasons a mixture of alcohol and gasoline for automobile fuel is being recommended by farm relief advocates.

Use of the fuel by motorists would consume 680,000,000 bushels of corn a year, greatly reducing the crop surplus, it is said. The gasoline would be diluted with 10 per cent of alcohol. It is claimed the fuel results in greater power at considerably less cost.

Midwestern farmers, seeking adoption of the fuel, claim that it has a higher anti-knock value, will start the motor more readily, give a faster pickup, form less carbon, will not increase oil dilution, and results in a cooler engine than ordinary gasoline.

The fuel, they say, uses a greater volume of air and burns more evenly in the cylinders.

Moving Shelves Pass Customers in New Self-service Store

At top—Customers sit at ease selecting groceries as shelf moves past. Lower photo shows clerk restocking the endless shelves. Inset shows operation of the novel store.

CUSTOMERS sit at ease as shelves move past them in a new self-service market opened in Los Angeles. The shelves are attached to an endless chain. The customers sit on stools before a counter and pick the groceries they want as the shelves move by. The moving shelf is 157 feet long and makes a complete revolution every eight minutes.

A great number of customers can be served simultaneously without the need of clerks to wait on them. As they leave the store the goods are checked by a cashier. The endless shelf passes around the rear of the store where the shelves are restocked.

The units of the endless shelf are neatly arranged, the various types of food, such as jams or canned vegetables being grouped together for easy selection. The shelf is driven by an electric motor.

Seedless Tomato Grown in Texas

AFTER long experiment, a seedless tomato has been developed by an Amarillo, Texas, florist. The flavor of the tomato is improved with the disappearance of the seeds, it is said.

The seedless tomato was developed after years of taking cuttings from plants producing tomatoes with the fewest seeds. New plants were grown from the cuttings and the florist now has a complete group of plants showing the stages of seed elimination.

Auto Compass Guides Drivers

Automobile compass was designed especially to guide motorists through strange country.

AN automobile compass, designed to aid drivers in strange cities and lands to travel in the right direction, is now on the market.

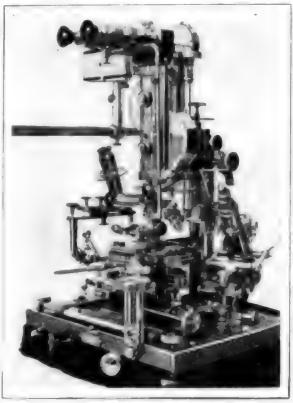
The instrument, similar to an airplane compass, is of the liquid type with a rotating dial encased in heavy glass.

Microscope Magnifies 20,000 Times

A NEW universal microscope that has a magnification of 20,000 is expected to bring greater success in man's battle against disease germs.

With present microscopes only germs that have reached maturity could be seen. With the new powerful 21 phase microscope it will be possible to study and photograph germs in immaturity, giving scientists a greater knowledge of the development of disease.

The microscope was invented by Dr. Royal R. Rife. Object and light are transposed 21 times before being photographed.



This highly complicated microscope with a magnification of 20,000 reveals immature germs never before seen by man.

Bullet-proof Shield Protects Police Officers in Gun Battles

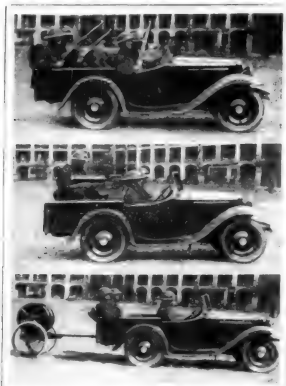
COLLAPSIBLE armored shields to protect the bodies of police in gun battles have been invented to aid Uncle Sam in his war on crime. The shields were designed following the slaying of four officers in front of the Union station in Kansas City, Missouri.

The collapsible armor permits free movement of the body. The shield is made in three sections, the two end sections hinging to the center body piece. At the top is an opening fitted with bullet-proof glass through which the officer can see ahead.

The center section has an opening at the right through which the gun barrel projects. A strap hung over the shoulders holds the shield in place, while the left hand keeps the shield at the desired distance from the body. The shield leaves only the legs from the knee down exposed to gun fire.

At left is a front view of the collapsible armor, designed to shield police from bandit bullets. The photo shows that only the legs from the knees down are exposed to gunfire. The officer has full forward view through bullet proof glass near the top. The drawing above shows how the shield is hung over the shoulders. Due to the hinged sections the shield may be worn while sitting in an automobile.

Midget Cars Mechanize Infantry



Three army uses for midget trucks are shown here. Above the truck transports a four-man patrol. In the center it carries a machine gun and below, the truck, equipped with a reel trailer, lays wire for field communication.

MIDGET cars, equipped with pickup bodies, have proved very useful to the infantry following gruelling army tests at Fort Benning, Georgia.

The tiny trucks are large enough to transport small patrols of four armed men who can advance as scouts ahead of the column on the march. Machine guns also can be carried quickly to the scene of action. Equipped with a reel trailer, the trucks can lay communication wires much faster than is possible with a mule or with a hand cart

Rotary Mower Has Vacuum Suction

ON THE same principle as the vacuum cleaner, a power lawn mower, invented in England, draws up grass cuttings by suction into a container.

Rotary blades that cut with a scythe-like motion also feature the new mower. This rotary motion permits operation of the mower in any direction. The machine is equipped with an adjustment for regulating the depth of the cut.

The mower is being put on the market with either an electric motor or with a two-stroke air-cooled gasoline engine. The machine has been found so light and handy that lawns can be kept in first class condition with but a fraction of the effort and time necessary with the old type power mowers. The steel cutters are renewable.

This English power lawn mower has rotary blades and draws up cuttings into a container like a vacuum cleaner.

MODIFIED

Modified stock cars burning up the speedway in a game called "lead in the foot." This feature event is considered slightly more hazardous than "blind man's buff," or blind racing. Emil Andreas, riding a De Soto, is close on the heels of Phil Schaffer in a Model A Ford.

by **ROBERT M. ROOF**

MODIFIED stock car races are now being featured on almost every dirt track race in the country. These spectacular events are winning a fast-growing popularity, attracting thousands and thousands of people on the look-out for some new thrill.

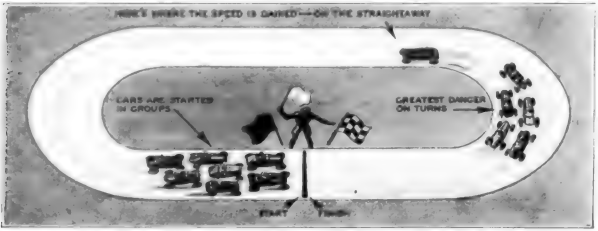
As this sport increases in popularity, the chances for steel-nerved drivers to win huge purses also become more numerous. State and county fairs most always stage a stock car race—and it is here that budding young speed demons get a chance to break into the racing game.

The races are most generally run on a percentage basis, forty per cent of the gate receipts being appropriated as prizes. When the weather is hot and clear the purses are very attractive, for we find that the hotter the day the faster these stock cars will run and this in turn attracts more people to the track.

Every owner of these stock car racers thinks he has the speediest of them all, but when he gets to the dirt track he finds that it is a battle royal. After the smoke has cleared from the track and he realizes what speed the other cars have his first thought is, "How can I make this Alligator (a term used for a slow car) run faster."

From experience we have learned that the following stock cars are best suited for these modified stock car races. Model A Fords, Model T Fords, V8 Fords, four and six cylinder Chevrolets, Plymouths, DeSoto and Studebaker, Pontiacs are also adapted for stock car racing.

Modified stock car racing gives the amateur driver an opportunity to demonstrate his driving ability. It is from these stock car races that the owners of big priced racing cars pick their drivers, for they are not afraid to trust their cars with them.

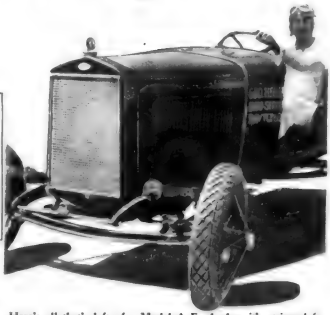


Artist's drawing here shows outstanding features of modified stock car race. First lap of race is most dangerous of all, as each driver wants to get into the turn first. A good driver must have a clear eye, a quick mind and "lead" in his foot.

STOCK CAR RACING

America's New Sport of Thrills

Modified stock car racing is taking the country by storm, and offering young speed demons a chance to win handsome prizes. Here an old head at the game tells you how you can strip down your car and qualify for these spectacular events.



Here's all that's left of a Model A Ford when it's stripped for action in a stock car race. Note that headlights, fenders, and the windshield have been removed to reduce wind resistance.

Two ten mile sprints and a feature race, generally a twenty or thirty mile event, meet all the demands of the racing fans.

The stock cars must qualify for their positions in the race on the morning of the race day. It is a general rule that the ten fastest cars are allowed in the first event, and the slower cars in the second or consolation race.

The winning cars in the first event are not permitted to race in the consolation event. This gives the slower cars a chance to win some money to defray traveling expenses.

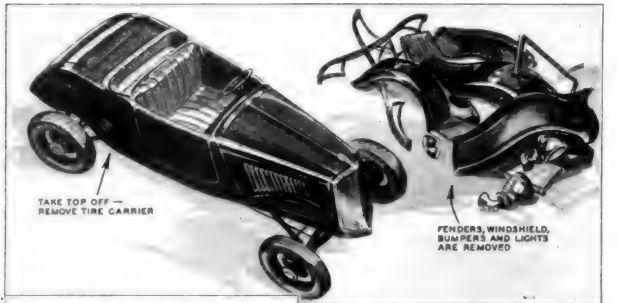
During these two ten mile races, a number of cars will drop out because of some mechanical trouble, which generally leaves about sixteen cars at the starting line for the last and feature event.

In addition to these three regular races there is usually some stunt race. The photo shows two of these stock cars in a blind-fold race. There is some trick about this blind-fold race. On one occasion as the writer was standing on the track, one of these drivers started directly towards him, but swerved his car just in time, but it did give the writer a cold chill.

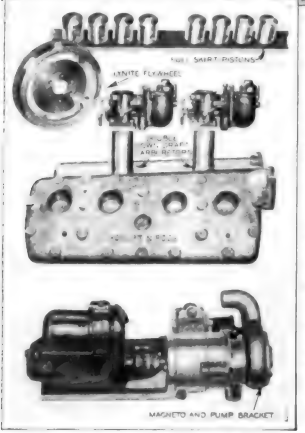
These stock car races are conducted in a first class manner. All owners and drivers are required to sign a track release against damages of all character.

There are certain signal flags used in these races. The white flag is used to start the race, the green flag means you are starting your last lap, the checkered flag is the

A group of "crates" lining up for participation in the 30-mile event at a state fair. When starting, the drivers are stationed in the positions they qualified. A secondary event for slower cars is featured, with consolation prizes to defray expenses.



To reduce wind resistance to a minimum, all protruding parts, such as headlights, fenders, hood, windshield, must be removed, leaving the body bare—but capable of covering ground faster.



Here are illustrated the alterations you'll have to make in motor of your stock car to pep it up for the races.

one, all the boys look for, their cherished hope, a winner.

When starting the race the drivers are lined up in the position they qualified. The fastest qualifying car is known as the pole car. The pole car leads the pack around until they are lined up for a flying start. This is the time for the white flag and the race is on.

The first lap is the most dangerous of all as each driver wants to get into the turn first. After this lap they scatter out and this releases the nerve tension on the drivers.

A good driver has a clear eye, quick mind and plenty of lead in the foot. A good driver will always give a fellow in a jam a chance to get out. This always appeals to the fans. A dirty driver never gets very far in racing.

Stripping the Car for Action

While building these modified stock car racers one must be like a doctor with a number of patients each with a different disease. Each car requires separate and individual attention. Take the Model A Ford, which has been winning most of these events. This is how we start.

Remove all the fenders, headlights, windshields, top and any other part that would cause any wind resistance. Take out the front and rear springs and have them straightened. Two inches of spring clearance is sufficient.

It is best to use double acting oversize shock absorber in front and rear. These keep the car on the track and make it fast. The 1928 or '29 Model A Ford is preferred.

New Ford V8 Is Fast Racer

The new V8 Ford wheels and tires fit these models and make a strong combination. The V8 Ford gear ratio, which is four and one ninth to one, is what the boys are using on the one-half mile tracks and they would use four and one-third to one if they could secure them.

When reconstructing the engine it is best to remove it from the chassis and take it to a machine shop. Bore out the valve ports on the top and side to one and nine-sixteenth inches in diameter, and only five-

eighths of an inch deep. These dimensions cannot be exceeded, as you would cut into the water jacket. A thirty degree valve seat reamer is used to make the new valve seats. The valves which are used are special for racing, carrying compound springs with the liberty locks and keepers for retaining the valve springs.

A valve clearance of twenty-thousandths of an inch is allowed. A special racing camshaft which gives the valves a higher and faster lift is used to secure a high R. P. M. Steel timing gears are used with this valve and camshaft assembly.

Some of the boys are using pressure oiling systems on the main bearings and splash systems on the connecting rods.

Special Racing Pistons Required

Solid skirt nickel aluminum racing pistons are necessary to carry these extreme high compressions. The top of these pistons should come one-thirty-second of an inch from the top of the block when on top dead center.

The cylinder heads used on these Fords are known as the flat head type, the compression ratio being between seven and eight to one.

Carburetion and manifolding are very important factors in getting the R. P. M. The photo shows type of oversize manifold with velocity pipe and the racing Winfield downdraft carburetor, the same type carburetor used on the winning cars at the Indianapolis Motor Speedway.

Ignition Equipment

The final equipment is the ignition. There are two different types, battery and magneto system. Every driver knows that the magneto system is the faster. The photo shows how the magneto is attached to the block. It carries its own water and oil pump, and does not carry a fan pulley. This eliminates the fan and belt. No fan is used on these fast stock cars.

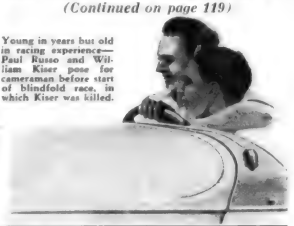
The second type is the double breaker Mallory distributor. In connection with the distributor, a special racing coil is used which has a double winding with thirty thousand turns. This makes a very hot and fast spark. It requires the special racing metric spark plug to withstand the compression and spark.

All cars described in this article use a special fuel dope in their gasoline. The flying mass consists of crankshaft, connecting rods, pistons and pins, flywheels. All these must be kept to the lowest possible weight. For this reason we use a Lynite Flywheel with the driving face lined with steel giving it a weight of about ten pounds. This gives the motor quick acceleration and deceleration.

Converting Chev Six Into Racer

For the Chevrolet Six, we find the following parts used to make them fast for stock car racing. The standard Chevrolet cylinder head is used with the following changes. We plane off 3/16 inch from the head and bore out the intake and exhaust ports as large as possible and install the new racing valve with 30 degree seat with compound springs and keepers. Also pistons are removed and solid skirt aluminum is used to stand the strain and R. P. M. A special intake manifold built of tubing, extra large size to carry a 1½ inch Downdraft Racing Winfield Carburetor with this. The flywheel is removed and a Ly-

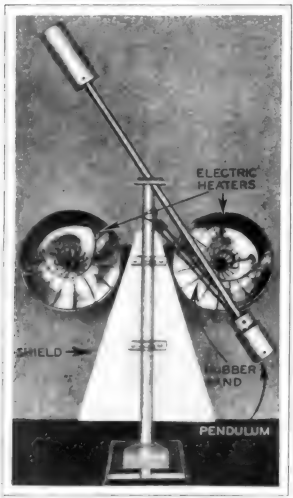
(Continued on page 119)



Young in years but old in racing experience—Paul Russo and William Kiser pose for cameraman before start of blindfold race, in which Kiser was killed.

Stock car races feature a stunt event called "blind man's buff," which gives the spectators some thrilling moments. Blindfolded, the drivers tear around the tracks at top speed, with death waiting at every curve. Try driving around the block with your head in a bag—that's what it's like.

Vision Perpetual Motion In This Rubber Band Engine



The rubber band is the motor of this engine. The heaters contract the rubber and cause the pendulum to swing.

AN ENGINE run only by a single rubber band—does it have possibilities of perpetual motion?

Many who saw it on exhibit at the Hall of Science in Chicago's Century of Progress Exposition believe it has. The engine, shown on the left, obtains its energy from heat directed on the rubber band. Many persons visioned the probability of substituting solar heat for the electrical heaters used in the exhibit. However, perpetual motion is an impossibility as the machine would run only during life of band.

The apparatus consists of an electrical heater on each side of a vertical support on which swings an ordinary pendulum. One end of the rubber band is attached near the top of the support and the other to the lower end of the pendulum.

The engine is started by turning on the current and giving the pendulum a starting swing. As the pendulum reaches the end of its swing, the rubber band is stretched about 300 per cent and is directly in front of one of the heaters. The heat causes the rubber to contract, forcing the pendulum back on another swing. As the rubber band passes through the shadow of the shield, it is cooled off and allows the pendulum to swing out to the other heater.

Old Blocks Save Concrete Cost

MAKE that new garage floor of discarded concrete and cut the usual cost of ten cents a square foot to a penny.

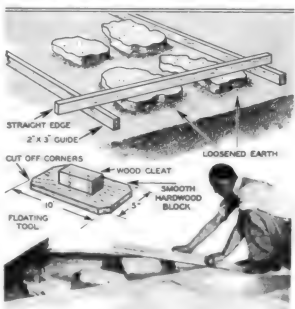
Old cement blocks and broken concrete can be found almost anywhere and hauled away without cost. The blocks lessen the amount of the new material required.

Prepare forms for the cement of 2x4 or 2x3-inch timbers, according to the thickness desired. Space the pieces of old concrete or cement blocks from three to six inches apart to permit the new concrete to flow among them. Set each block on loosened dirt or sand. By pounding and turning the blocks force them down to a solid footing. Run a straight edge over the top of the form to be certain the blocks are below the floor level.

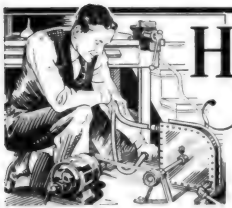
The job is then ready for rough cement. This should be placed well around each block and tamped slightly, allowing about one-eighth of an inch for the top layer of fine cement. Smooth the top with the floating tool shown in the drawing.

Walking Sponge Shocks Science

SPONGES creeping from place to place seeking food appeared mysteriously in the London Aquarium. Scientists ridiculed reports of the keepers, since sponges have been known only to permanently fasten themselves to the sea's bottom. However, Maurice Burton, British Museum expert, proved the keepers were correct.



Cement garage floors cost little when pieces of old concrete are used to cut down the amount of new cement needed.



HANDIKINKS *for Everybody!*

Save time and labor by consulting these pages when you have a "different" job on your hands.

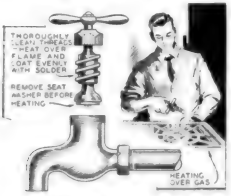
Tire Well on Car Is Ideal for Testing Tubes

THE motorist faced with the task of repairing a tire on the road has difficulty finding the puncture. A tire well makes a simple job of this. All you have to do is cut a hole under the well and attach a petcock. Pour a couple quarts of water into it and the leak is easily found.

A tire well will work better than a bucket for this purpose because there isn't any chance of the tube becoming kinked over the hole and temporarily plugging it. Another advantage is the small amount of water necessary due to conformity in shape of well and tube.—A. H. Waychoff.

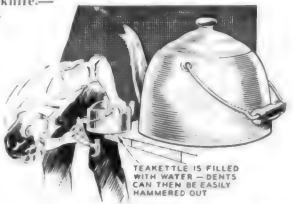
Solder Stops Noise in Water Faucet

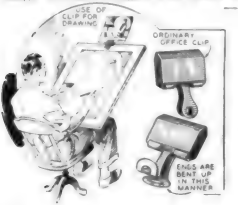
WHEN a water faucet develops a noise, invariably the cause is due to worn threads on the stem of the valve. This can be remedied by thoroughly cleaning the threaded part and giving it a heavy, smooth coat of solder. Remove seat washer and heat stem over the gas stove until it will fuse with the solder. Any surplus solder may be scraped away with a slender knife.—Dick Cole.



Hammer Takes Out Dents in Kettle

TEAKETTLES have a way of developing dents and bulges that add to the woes of a housewife. This need not be if you use the method shown in the accompanying sketch. Fill the kettle with water and, using a hammer, pound the bottom until all dents are removed. Kettles will then slide along a range without trouble and much less noise. —M. Lonn.



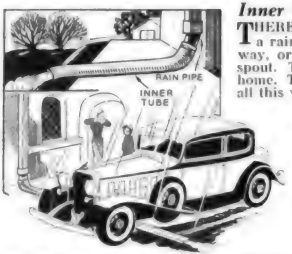


Paper Clip Holds Artist's Model on Board

WHEN it is desirable for an artist to have his working model close to him, as is the usual case in reproducing from another drawing, an ordinary office paper clip will serve the purpose. The ends which are used to open the clip are both bent in the manner shown in the drawing at the left. The clip is then fitted over the model and attached to top of drawing board.

Artists using this stunt find it productive of better work as the model is always within close proximity to their eyes.—Bernard Thompson.

Ideas of Interest to Everyone



Inner Tube Carries Water From Rainspout

THERE are several bad features in connection with a rainspout. Often they stain the walls, the driveway, or erode the soil where the water leaves the spout. This causes untold damage to the value of a home. The following simple method does away with all this while not impairing the beauty of a building.

Take an inner tube and wire it securely to the base of the spout as shown in the illustration on the left. Place the opposite end in a convenient location where water running out will not damage. An automobile can be driven over the tube if it happens to be placed on the driveway. The inner tube drain can be of any length. Any number of inner tubes can be vulcanized together and the rain water directed to a sewer, catch basin or water barrel.—Jerry Brixius.

Tire Casings Used for Traffic Signs in Street

THE use of old tire casings is a novel way to mark "through" highways or "stop" streets. These casings are partly buried in the roadway, as shown in accompanying sketch on the right. An appropriate sign is painted upon them such as "STOP" or "CAUTION." The flexibility of the rubber prevents damage to any car which may happen to run over it. They are easily seen at night and much cheaper than the more common cast iron markers. The strong inner bead of the tire keeps it upright.—Herman P. Roth.

Easy Method to Waterproof Canvas

BRUSHING wax on canvas with a broom greatly simplifies the problem of thoroughly waterproofing tents and other camping equipment. A solution is made of paraffin wax and naphtha. The consistency of this solution should be thin enough to permit it to be easily spread on the canvas with a broom. Spread the canvas on a floor. To prevent it from wrinkling it is advisable to tack it at the corners. Dip the broom in the solution and brush it over all parts of the canvas.—C. H. Holm.

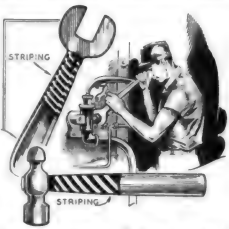
An Automatic Shut-off For Attic Pump

HOME owners who have water pumped from the out-door cistern to the supply tank in the attic by means of electric power know what a common occurrence it is to forget to turn off the pump. This usually leads to considerable water running into the basement through the overflow pipe. To obviate any such accident, one may employ the simple method shown in the illustration at right. A pail is suspended beneath the outlet of the overflow pipe. A suspension string runs from the pail through several screw-eyes in the ceiling to the pump switch on the wall. When the pail fills sufficiently, the switch is thrown, shutting off the water.—G. E. Hendrickson.

Simplifying Workshop Problems

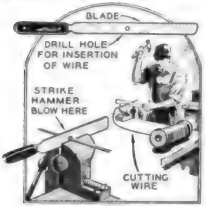
Stripe Your Tools to Prevent Losing Them

A MECHANIC working in a large plant invariably gets his tools mixed with those of his fellow workers. This is hard to avoid inasmuch as tools have a way of resembling each other. Here is a simple method to make your tools stand out and thereby lessen the chance of being lost. Assemble all your tools and mark them with a colored enamel in even stripes, as shown in the accompanying illustration. This will eliminate arguments over ownership and the searching for chiseled numbers on lost members. The colored stripes also add greatly to the appearance.—William Proffit.



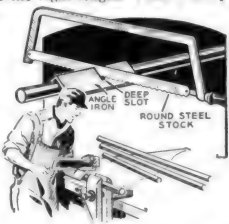
Method for Shearing Wire

SHEARING accurate short lengths of wire is often a difficult task. Not so, however, with the ingenious little stunt being demonstrated in the illustration on the left. All you have to do is take a strip of iron and drill a hole in it as shown. Then rig up a handle to fit your hand. Be sure to harden the iron to add to its strength. Place the iron in a vise with the drill hole just above the jaws. Tighten the vise to hold firmly. Run the wire through until you have the right length. Then a sharp blow with hammer will shear the wire. —Lester P. Young.



Notch in Angle Iron to Guide Hack-saw

THE difficulty encountered by mechanics in starting a hack-saw to cut round steel stock led to the simple little kink pictured in the illustration at the right. It consists of a deep slot, to act as a guide, sawed at right angles in the center of a short piece of angle iron. The round iron to be sawed is placed in a clamp and the jaws tightened securely. The guide angle iron is then placed over it. In this manner the saw is guided and starts work quickly. Mechanics using this simple aid find it speeds up work and is a great boon to accuracy.—Loren Simer.



Leather Strips Lengthen Life of Mallet Head

THE life of a wooden mallet isn't long if it has to stand up under continual pounding without adequate protection. Here is a kink for that purpose. Take two leather strips and cover the pounding surface. These are held in place by screws. When the leather finally wears through, as it will, the strips are easily replaced. The mallet will thus last indefinitely.—Robert Knoble.

Handy Insulation Stripper

A VERY useful insulation stripper can be made from an ordinary paring knife by following the drawing at the right. First cut off the end of the blade to make it flat. Then bend about an inch of the remaining blade at a ninety degree angle and notch it on an emery wheel or with a file so it appears as shown. Restore the temper and the blade is ready for use.—Chas. Knapp.

Handy Household and Garden Items

Bottle Cutter Makes Attractive Glasses

ATTRACTIVE drinking sets may be made from bottles by following this simple method for making a glass cutter. Heat a ¼" steel rod and bend to shape shown in the drawing at left. The end is slotted to admit the wheel from an ordinary glass cutter. A hole is drilled for a pin which acts as the wheel's axle and permits replacement when cutter is worn. The adjustable guide is made of wood or metal and fits loosely into the bottle neck. One or two sharp taps near the top of the bottle will usually make a clean break.—C. E. Avery.

Novel Two-edged Grass Sickle

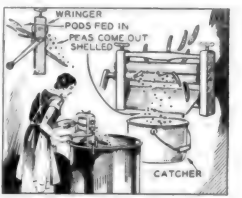
HERE is a grass sickle with double action that is easy and cheap to make. The cutting part is made from seven safety razor blades of the Gillette type. The holder is a piece of aluminum 20" long on which the blades are screwed and held in place by an 11½" iron strip. The aluminum may be bent to form a handle and should be taped to fit the hand, as shown in illustration at right. Change the blades when the sickle gets dull.—H. I. Shumway.

Handy Chicken Catcher

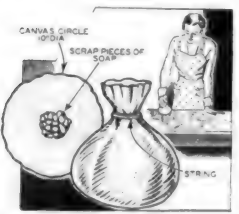
IT WILL be a much simpler task to catch chickens if you'll rig up the following gadget. Take a heavy door spring and heat it, being sure to leave several coils near the middle intact. Straighten out the heated ends, placing one end into a wooden stick that serves as a handle and shaping the other to form a hook, as shown in the drawing at left. Cover the exposed end with cloth so as not to injure the chickens. The device is now ready for use. Slip it around a chicken's leg and the fowl is caught. —Wilbur J. Brown.

Clothes Wringer Used to Shell Peas Rapidly

SOMETHING that the housewife might well bear in mind is that her clothes wringer will serve as a highly efficient pea sheller. The rollers will not crush the peas but only the pods. It is preferable to feed the pods into the wringer stem first. The set screws which control the tension of the rollers should be turned down tightly.—A. Vanberger.



Using Up Small Soap Scraps

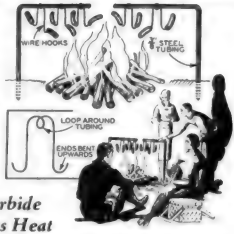


SMALL leftover pieces of hand and laundry soap may be utilized to the best advantage in the following manner. Cut a circle of canvas to form a 10-inch diameter. Place the soap scraps in the center of this and fold edges around soap, tying the top securely with string, as shown in accompanying illustration. This device is especially handy for cleaning bathtubs, sinks, kitchen tables, shelfboards, etc. Always rinse out the canvas after use and wring tightly to get out surplus water. The smaller the pieces of soap the better will be the results.—W. Schmidt.

Helpful Stunts for Handymen

Here's Novel Way to Roast Weiners

ENJOY your weinie roast completely by eliminating smoke, heat and a tiresome wait. All you have to do is follow this simple procedure. Take two pieces of steel or tubing and bend them near the middle. Sharpen one end of each to permit pushing into the ground. Then get some galvanized wire and cut into short pieces. Each wire is then looped around the tubing as shown at right. When weinies are in place, the rods are swung over the fire. After sufficient toasting, swing the tubing away from the fire and take off the weiners. The hooks will not get hot.—H. R. Schoenlaut.

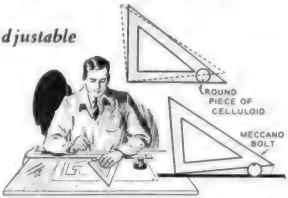


Old Carbide Can Saves Heat

HERE is a device that will cut your coal bill considerably. All you need is an old carbide can, three bolts and a little furnace cement. Turn the carbide can upside down and lead the furnace pipe into it to extend about four inches from the bottom. Then place three square-headed bolts the same distance apart around the pipe so the can has a rest. Lead the chimney pipe into the can about four inches from the top, which is now the bottom, and spread furnace cement around all fittings. Much of the heat that once escaped through the chimney is now saved and will make the basement workshop comfortable.—Leo D. Harris.

Kink to Make an Ordinary Triangle Adjustable

NO HIGH priced adjustable square is necessary for special angles if you make use of this little kink. Take a draftsman's 45-degree triangle and cut out a small circular piece of celluloid from the center. Attach this with a meccano bolt to the edge of the square as shown in the illustration at right. For a special angle just twist the round celluloid circle downward.—M. Lonn.

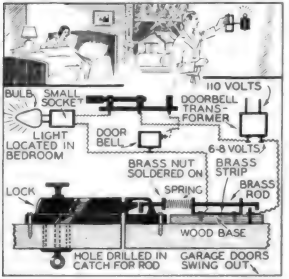


This Device Tells If Door Is Locked

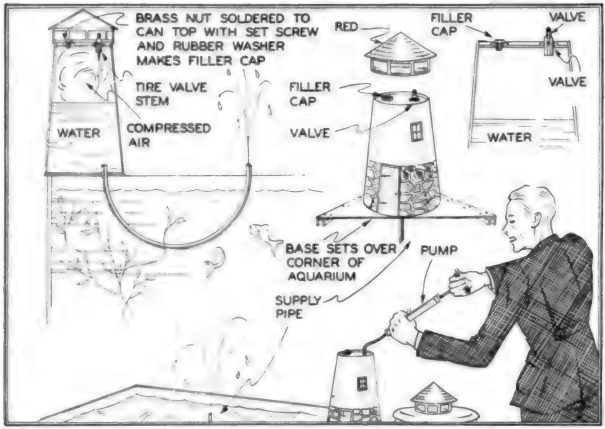
IF IT'S your wife's habit to remind you to examine the door lock just as you're about to roll into bed, rig up the following stunt to eliminate the walk downstairs.

The accompanying diagram at left shows how such a lock may be wired to an annunciator light anywhere in the house. The doorbell circuit is used with a spring switch actuated by the lock bolt. When the bolt is not in place, the switch remains closed turning on the light if the two-way switch is in the proper position.

The two-way switch may be located beside the signal light where it is easily thrown on for a test and then turned back so as to leave the door bell in service.—Paul E. Cross.



Simple Aquarium Aerator



A simple, yet decorative, method to aerate aquarium water is illustrated, with construction details, in drawings above.

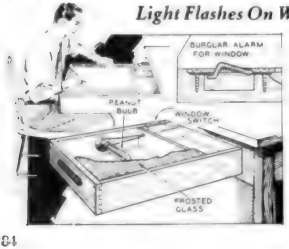
AERATION of aquarium water is an absolute necessity and the tiny fountain, shown above, with its fine spray, impregnates the water with myriads of air bubbles. The tank itself is made to resemble a lighthouse, with an attractive hinged door, a window set up high, and a roof which can be taken off and put on at will.

Light-gauge galvanized iron is used for the house. Be sure that all fittings are soldered securely. A brass nut soldered to the can top with set screw and rubber washer makes a filler cap into which fresh water may be poured. A valve stem is placed along side the filler cap and is used to supply air by means of a bicycle pump. As the tank is above the surface of the water, no great pressure from the bicycle pump is necessary to make the fountain spray.

The base, holding the lighthouse, is placed over one corner of the aquarium. It has a hole drilled in it from which the water from the lighthouse flows through a ¼ inch copper tube ending on the surface of the aquarium water. See drawing above for bending of tube. The surface opening for the copper tube should be plugged and a pinhole drilled in it.

Paint the base of the lighthouse to give a rock impression.

Light Flashes On When Tracing Board Drawer Is Opened



HERE is a most useful item for persons who do considerable tracing. It makes use of a common type burglar alarm for windows and automatically flashes a light on or off.

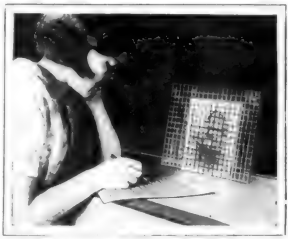
The alarm is placed on the edge of a table drawer near the back end and wired up to form a contact whenever the drawer is opened. A peanut bulb supplies the light and is placed on the side with the burglar alarm but in the drawer's main compartment. This is then covered with frosted glass.

When the drawer is opened, a contact is made, lighting the bulb. Pictures placed on frosted glass are easily traced.

Copying Pictures Is Easy With a Cross-lined Glass Guide

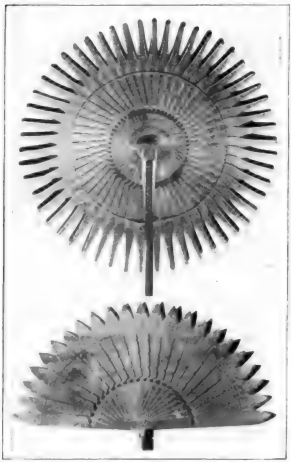
A PICTURE or design that you wish to copy in exact proportions may be accomplished in the following manner. Using a piece of clear glass large enough to cover the object, draw parallel lines a half inch apart both vertically and horizontally, making half inch squares. Then set the glass up in front of the picture, as shown in illustration at the right, and proceed with your copying to scale, with the squares as guides.

This method is also excellent when copying designs of scroll-work or other irregular pieces that need to be made to scale.



Amateurs can produce good copies using this squared glass.

Delicate Fans Carved From Wood



Intricate fans such as these can be made by carving a piece of wood and then splitting it into thin leaves.

AT TIMES it is hard to realize just what intricate designs may be carved from a single piece of wood. The above photos show two carvings that might be rated as prize winners. The upper illustration is of a circular fan made from a half inch single piece of wood. The lower is of a more typical shaped fan but requiring just as delicate work.

The two fans together required many hours of patient work by their maker, but the results were perfectly gratifying. Made from a light grade of wood, they are entirely practical.

Etching Steel With Rubber Stamp

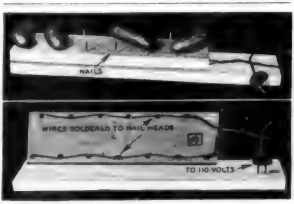
A RUBBER stamp bearing your name may be used for etching steel articles. First dissolve one half ounce of shellac and the same amount of dragons blood in a pint of alcohol. Steel article is then pressed with stamp, engravers' etching ink being used. Next, sprinkle with dragons blood, heat gently, dip in prepared solution and heat again until enamel bakes evenly.

Rub cotton saturated with gasoline over inked part. The article is then suspended in a 40% solution of iron perchloride until proper effect is had.

Electric Spikes Roast Weinies

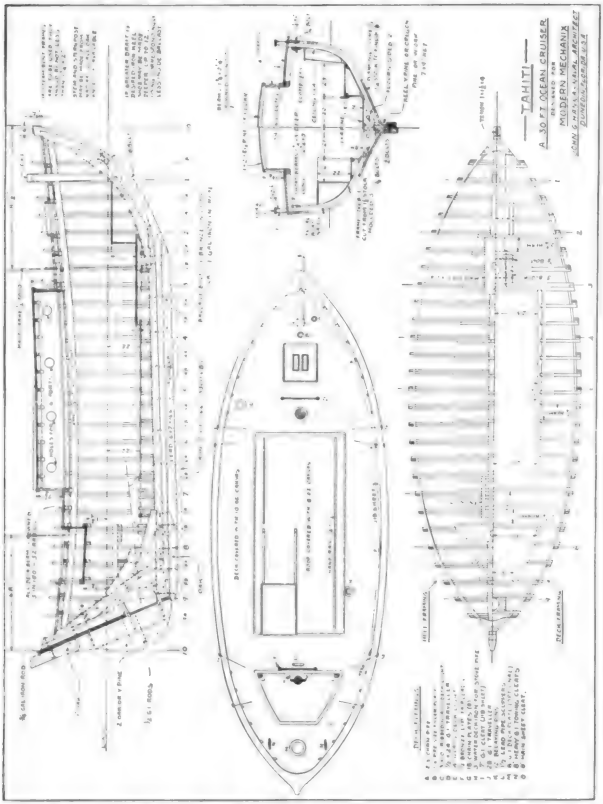
MANY weinie roasts planned in advance are dismal failures because when that day arrives it is pouring rain and the usual procedure is to call off the party. No need for that if you'll utilize the little stunt below. You can hold your roast indoors.

All you need is two boards, a few nails and an electric light cord. Nail the 110 volt cord underneath the top board with large-headed nails. The nails should be placed between the strands of the cord for better heating effect and to hold the cord in place.



Roast weiners by placing them on spikes connected to 110 v.

PLANS for "TAHITI"



Every detail of the framing of this great little ship is shown above. Study the plans; see how stoutly she is put together, how shipshape her planning is. Inboard framing plan shows in dotted line where iron is to come if used for keel instead of a lead casting. Sectional plan gives all scantling sizes. Deck plan shows layout. Lettered parts given in table show list of deck fittings. Above all things, build this ship as she is designed. Never the deckhouse ceiling. This serves to fasten the sides of the deckhouse still more firmly to the deck, and as well makes a tighter house. Best practice in designing prescribes parallel sides to deckhouse.

a SAILING CRUISER

Below is yet another Tahiti, built from these plans. Black hull, buff decks, white deckhouse, and red sails make a practical color combination, smacking of the high adventure this grand little ship is capable of bringing to you.

by JOHN G. HANNA

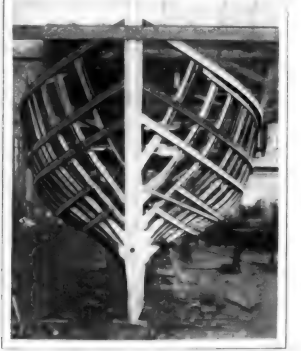
Hitting the nail right on the head with all real sailormen who know a ship when they see one, Tahiti's plans are being avidly watched for from Iceland to the Trobriand Islands. This second installment of her story points to construction.

THE first and most important advice I can give you who have decided to build this boat is build it just as it is. If you want to take your family and a couple of friends and some of the wife's relations, and find *Tahiti* will not hold all, for pity's sake don't write me and ask if you cannot stretch it out 20 feet and build on a deck house and a back porch. The answer is printed right here: NO! It is comparatively easy and usually safe to enlarge or reduce the plans of simple little motor boats of the V bottom type, but a modelled hull like this, designed to the proper mathematical constants for its size and to meet the requirements of the most rigorous service, is something else again. No alterations are permissible, except, of course, that you can cut up the inside to suit yourself, if you do not like the standard cabin arrangement. If you want a larger boat, the thing to do is to buy plans of a boat especially designed as a large boat should be.

I have stock plans available for 36 and 45 foot double-enders. These plans will cost you more than those of *Tahiti*, however, and the boats themselves will cost you very much more. For the dumbest of all dumb land-lubber notions is that the cost of a boat is proportional to length. The truth is, its cost, like that of all manufactured articles, is proportional to its *weight*, and this increases many times faster than the length.

Which brings up another question that I know a raft of you are just itching to ask me: how much will it cost to build *Tahiti*? Search me; I dunno. In twenty years experience, I never knew two boats built to the same plans to cost the same, unless they were exact duplicates turned out by factory mass production methods. But, in general, it is safe to say that you must not even think of building any boat as large and husky as *Tahiti* unless you have, or know where you can borrow, beg or steal one thousand good U. S. dollars. Some men may build it for less, and some will spend twice that. A little brain work often makes two dollars do the work of five. For instance, very choice timber can sometimes be found at nominal cost in old buildings being torn down. Such stuff, seasoned for perhaps 40

Stern View of "Tahiti" in Frame



Here's how Tahiti looks in frame from the stern end. Considerable of a boat, but not hard to build if you go at it a task at a time; you will find her soon done. As shown here the keel is securely blocked up, and the sternpost is well stayed to rafters in the ceiling of the shop. The ribbands have been bent around the moulds, and the frames have been bent in around the ribbands. The floor timbers have been put in, and the boat is ready for the garboard strakes to be fastened.

years, will be hard as rock, and as lasting, whereas new lumber these days is often cut from immature trees, or poorly seasoned. Again, if you live in lumbering country, you may be able to get material direct from a sawmill at half of retail prices, but be sure it is seasoned at least six months. The exception to this is the bending oak for frames, which MUST be fresh cut if you expect it to bend without cracking. If you live near forests, you may be able to cut trees suitable for masts—spruce, fir, cypress, some kinds of pine. Peel the bark at once, and see they are kept perfectly straight while seasoning. Of course they will need a lot of planing down to bring them to perfect round and correct taper. If you can't do this, spars must be worked out of square timbers bought at the lumber yard.

A Word on Materials

If you live on the coast, snooping around the water front will often dig up perfectly good, slightly used articles of equipment for sale at a small fraction of new cost. But be darned sure all such purchases *are* good as new. The south Pacific in the middle of a typhoon is a bad time to have some "bargain" equipment crack up on you. Above all, do not try to economize by substituting smaller sizes of anything than the plans call for.

The first step in building any boat is to purchase a set of blue prints. This magazine supplies them at a nominal price based on quantity production, much less than I could sell them for myself, and the price is an utterly insignificant fraction of the total cost of the boat. Without large shop working drawings always at hand, mistakes and spoiled material are going to eat up much more than plan cost. Professional builders refuse to try to build from small pictures in a magazine; they always get large blue prints, regardless of cost, because years of experience have proved they are a real economy. And any amateur who thinks he is smarter than a professional builder had better go jump off the dock right now and save himself much misery.

Lay Down Lines

The second step is to lay down a full size reproduction of the lines, by use of the measurements given in the table of offsets, on your shop floor. This very simple operation has been explained in this magazine 57 times, and the editor refuses to allow space to repeat the story again here. But in case you missed the information, the wise thing to do is to send just one dollar to MODERN MECHANIX AND INVENTIONS for a little book called *Small Boat Building*, by Capt. Patterson. Include it with your order for plans. It explains not only laying down lines, but everything else—whatever you need to know about processes and operations in boat building—and will be worth hundreds of dollars to the inexperienced man, because the right way of doing things is also the cheapest and easiest way. Do not write me, as so many have done in the past, asking how to saw out a plank to fit a scarph joint. My business is designing boats, not running a correspondence college in carpentry. Refer to the book for all such matters.

The first thing to tackle in actual construction should be the keel ballast casting, as it is the first thing to go down on the foundation blocks. This may be either lead or iron, but the iron will have to be deeper than lead, as shown by dotted lines, to get the same weight. Metallic iron is cheaper than lead, but iron casting is a foundry job, and when their charge for pattern, moulding, melting and pouring is added, the total cost comes to as much or more than a home made lead casting. You can use junk lead of all kinds, melted in an iron pot over a wood fire, and poured in a 2 inch wood box buried in the ground with top edge flush with surface and dead level. Paint inside of box with several coats of sodium silicate, or water glass, to prevent burning. You can't melt and pour several tons all at once, of course. When the first portion is in the box, sprinkle some sal ammoniac over it before pouring in another quantity, and they will melt together all right. *Very important note:* this casting must be made upside down—that is, bottom of box must represent what is to be the top of finished casting. This is in order to have the surface that is to come against the wood keel perfectly flat and smooth. Hardwood pegs

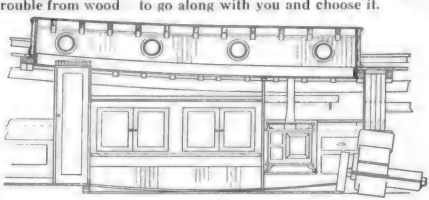
Tahiti, rigged just after the launch, but without sails bent. None other than Jack Hanna, deepwater sailor-designer of the boat, stands at the tiller viewing with suspicion the cameraman. Note the seagoing rightness of all details. This shot will help you check the rigging plan, and shows very well the disposition of nearly all standing rigging.

set in the box at proper places will form the holes for bolts.

It is absolutely essential to use bronze bolts for lead, or galvanized iron bolts for iron keel castings. Any change from this rule will result in quick destruction by electrolysis. Bronze bolts can be cheaply made from odd lengths of old propeller shafting, with bronze—NOT BRASS—nuts screwed on each end. Use heavy washers and some oakum or cotton soaked in white lead under the inside nuts on keel.

I am often asked if a boat can be built in the open. Sure, it can be. Millions have been. But it is poor economy. Rain or snow will stop your work many days, and there will be everlasting trouble from wood swelling up in rain, then drying, shrinking and warping in hot sun; never the same dimension any two days. In these times there are plenty of sheds and buildings vacant, which owners are glad to rent for just enough to cover taxes. Or you can build a shed cheaply from second hand lumber and sheets of corrugated iron. Be sure it is well braced, though, for if a wind flops it down on the boat, the damage may be costly.

Now for the keel. Hard long leaf yellow pine is the best thing for this. Oak is as strong, but hard to get in 22-foot lengths, and moreover the worms of tropical waters seem to have a special fondness for oak, although, of course, they will attack any wood not copper painted every 3 months or so. On the Pacific coast you will be tempted to use Douglas fir, as it is cheap and everywhere available. It is strong enough, but not as hard as the other woods, and does not hold fastenings as well. Still, it may serve, if you are careful to select a hard, heavy, close-grained piece. If you are not a good judge of lumber, get some friend who is—and I mean IS, not just says so—to go along with you and choose it.



STARBOARD SIDE OF CABIN

Although the designer's blueprints show the interior room better than this small illustration can, this shows Tahiti's comfortable cabin which has full headroom. Plenty of lockers, comfortable seats, made-up berths, —everything!

Bow View of "Tahiti" in Frame

Here's the bow view of Tahiti under construction. The moulds have been removed, the frames bent, and the gar-boards have been fastened in. Note the adequate keel blocking, the cross-staying at the stemhead and that the sheer plank is on.

The ideal way to make a stem is of two pieces hewed out of oak trees that grew in a natural curve the same as the stem. But it is almost impossible to find such in these days, and if you could find them, it would be necessary to rough shape them, then let them dry for a year before final shaping and bolting up, for such pieces always twist one way or another in drying. So the plans show how to cut all parts from straight grain timber, preferably oak or yellow pine. If joints are carefully fitted and bolted, this construction will be as strong as curved pieces. The stern timbers are all from straight grain stock. In the way of the shaft hole, of course, bolts must be in pairs, one each side of the shaft hole. You will have to buy a long bit, known as a ship auger, for making these holes. The cost is not much. Parts must be tightly clamped together or held by cleats nailed on each side, before boring. But before boring, lay all parts of keel, stem and stern on top of the full size lines drawing on the floor and be sure that the assembly checks exactly. You may not realize it, but the thickness of just a few plane shavings more or less on any of the joining surfaces may be enough to throw the stem or stern head in or out several inches. Go slow and patiently on this part of the work—it pays big dividends.

Bending Frames

Next we come to the question of frames ——which landlubbers insist on calling "ribs," a word sailors apply only to a pleasantly squeezable part of feminine anatomy. There are two general ways of making these: the sawed frame, composed of two layers of short pieces sawed to curve and bolted together, as shown on drawing; and one continuous piece steamed and bent to curve, as shown on photos. Either way may be used, but the skill required for laying out and cutting the sawed pieces to accurate form and bevel is so great that it is practically out of the question for amateurs, and not one professional builder in 1000 nowadays is competent to make a first class sawed job. If you can get hold of a real old-time shipbuilder who knows the art, and hire him for a few weeks, well and good. Sawed frames make the strongest hull, one that will hold its shape forever. They save the cost of temporary moulds and ribbands, but this is offset by greater material cost, as there is considerable waste in cutting out the pieces, also several hundred ¼ inch galvanized bolts are needed.

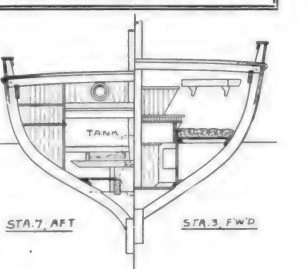
Sawn vs. Bent Frames

On the whole, the bent job is advisable for amateurs. It is entirely satisfactory—98⅔ of all small boats are that way. The very idea of a steam box frightens most amateurs. All right, forget it. Don't steam them. Boil them. It is every bit as good, and simpler. Get an 8 foot length of old iron pipe, 8 inches or more diameter. If you cannot find such, any tin shop will make one cheaply from thin sheet iron. Plug one end and rest it on the ground.

(Continued on page 118)

BLUEPRINTS FOR TAHITI
With Bill of Materials

Shop size blueprints drawn to a scale of one-half inch to the foot are available from the original drawings of the designer. For those who do not wish to wait for the final installment and for those who wish to build Tahiti the right way, these drawings are indispensible. They contain fastening sketches, and a rough bill of materials to help in estimating costs. The price for complete prints is $9.00. Address Modern Mechanix and Inventions Blueprint Dept., 529 So. 7th St., Minneapolis, Minn.



Stations 5 and 6 in section, looking aft. The great amount of space in the turn of the bilge, partly due to her beaminess, partly due to size, gives designer a swell place to put berths and plenty of locker space. A cabin you can live in!

SPARKS from the RADIO EDITOR

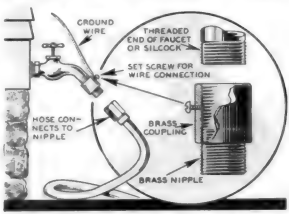
Edited by L. B. ROBBINS

Waterpipe Ground Brings in Signals Louder and Clearer

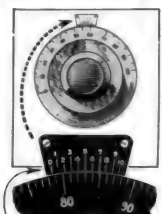
AFTER all is said and done, a good ground connection to a water pipe is one of the best. But just how to connect the ground wire to the pipe is often the problem. Ground clamps are weak to say the best of them, but here is an idea that anyone can assemble in a short time and it provides an excellent ground.

Some faucet or silcock about the place will have a threaded outlet suitable for a hose connection. Use this faucet as follows. Get a brass pipe coupling and a brass "close" nipple of the same size as the faucet. Thread the nipple *tightly* into the coupling without using any lead or dope.

About as many threads of the nipple should project out as shown on the faucet. Drill and tap the side of the coupling for a machine screw. Screw the coupling onto the faucet, connect the ground wire under the head of the machine screw (which must of course be a very short one) and there you are. The hose can be coupled onto the nipple exactly as it would be on the faucet itself.



Positive connection is made with ground by winding wire around screw on coupling and tightening with screwdriver.



VERNIER MARKED IN TEN DIVISIONS IN THE SPACE OCCUPIED BY NINE DIVISIONS ON DIAL

Scale of heavy white celluloid attaches above dial as shown.

Calibrating Receiver, Meter Dial for Close Readings

FOR use on a frequency meter, on a receiver set for the high frequencies and for other purposes of calibration or charting, a fine reading dial is absolutely necessary. Such a vernier arrangement can be made at the workbench by a careful workman, using any good dial with accurate markings. The resulting readings can be determined to within one-tenth of a degree.

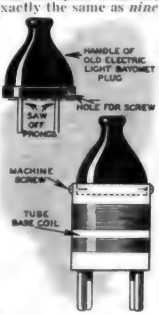
Cut a piece of heavy white celluloid in somewhat the shape indicated with the bottom edge to exactly match the curve of the dial edge. Then mark off this scale in ten equal divisions, the total space between 0 and 10 being exactly the same as *nine* divisions on the dial. Do an accurate job and scratch the division lines in the material, afterwards filling them with black paint. Mount this scale to the panel with a couple of small bolts so the 5 mark will come about where the pointer originally did on the panel.

To read in tenths, note the dial reading which lies opposite the zero mark of the vernier.

This Handle Saves Wear and Tear on Plug-in Coils

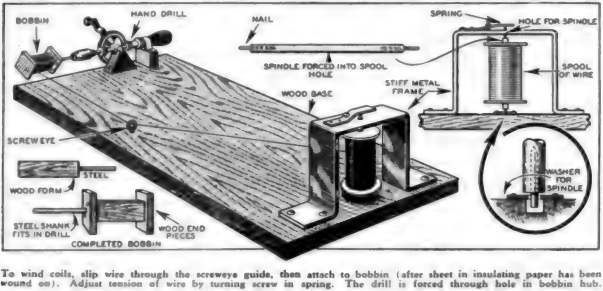
HERE'S a little stunt that will enable the user of tube base coils in his receiver to remove the coils easily. A real handle is provided and it will save tugging away at the coils with the danger of stripping the windings from them or otherwise injuring them.

Buy as many of the long-necked bayonet fixture plugs as there are handles needed. With a hacksaw, cut off the prongs close to the base of the plugs. Then drill a small hole in each side of the plug near the bottom. By going over this edge with sandpaper its diameter can be quickly reduced so it will make a nice snug fit inside a tube base. Fasten it securely with two little machine screws threaded into holes in the tube base and the handles will be permanently fastened in place.



To remove the plug-in coil, grasp bayonet plug with fingers.

Winder for Thousand-turn Coils Makes Counting Easy



To wind coils, slip wire through the screweye guide, then attach to bobbin (after sheet in insulating paper has been wound on). Adjust tension of wire by turning screw in spring. The drill is forced through hole in bobbin hub.

IT IS not an easy matter to wind a new field coil, transformer coil or any coil calling for several thousand turns of fine wire. But the labor can be greatly lightened by the use of a crude coil winder as illustrated. The wire tension is adjustable and the coil turns can be easily counted.

Use any large board for the base. At one end arrange wooden blocks and suitable clamps to support the breast or hand drill horizontally and in line with the end of the board. The drill chuck should come about 2 inches above the board level.

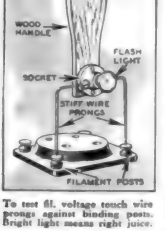
At the opposite end is fastened a U-shaped piece of wide metal as shown. Its inside height should be about 1½ inches higher than the height of a magnet wire spool. A hole is drilled through the center of the top and a washer with a small hole fastened to the base directly below it. Rivet a piece of spring brass to the top of the metal to bear lightly down over the hole.

Whittle out a wood spindle to make a force fit in the center of the wire spool. A headless brad in each end acts as axle. The spring tension on the top brad is adjustable.

The winding bobbin consists of a suitable piece of wood with the shank of an old drill driven in a hole lengthwise. Two removable flanges can be arranged to hold on the wire while winding. A few turns of paper are first wrapped loosely about the bobbin so it and the coil can be slipped off of the bobbin when finished.

The wire is led from the wire spool through a screw-eye directly in front of the bobbin and then to the latter where it is fastened for winding.

The number of turns of the chuck to each turn on the crank is then determined and the bobbin turns kept tallied this way. The run of the wire along the bobbin is maintained by slight finger pressure on the wire between the eye and the bobbin. A thousand turns can be wound in five minutes with this arrangement.



To test fil. voltage touch wire prongs against binding posts. Bright light means right juice.

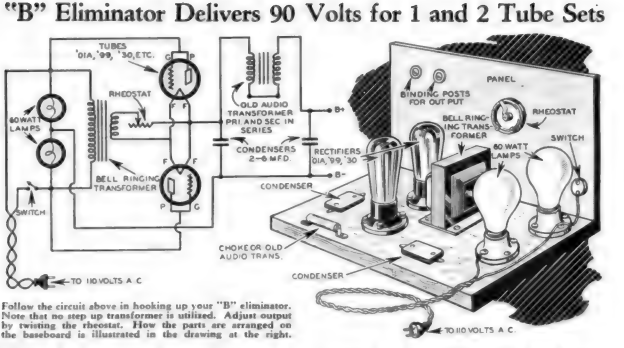
Filament Circuit Tester Prevents Tube Blowouts

EVERY time the amateur builds a receiver or a transmitter the filament circuits should be tested out to assure him that plate voltage is not flowing through. By using the little tester shown in the cut the circuit can be easily checked up and, if by chance high voltage *is* flowing through it the loss of a flashlight bulb is little to suffer compared to the more expensive tubes and meters.

Fashion a handle of any suitable wood about 8 inches long and 1 in. wide at the bottom end. Across this end fasten a flashlight bulb socket as shown. Then, in each terminal screw of the socket, fasten a length of heavy, stiff wire bent down at right angles and the same distance apart as the filament terminals on the sockets of the set.

With the tubes out of the sockets and the filament and plate power turned on, check up the filament voltage with the tester by placing the test points across the filament binding posts on all the sockets. If the plate voltage has been accidentally connected in the bulb will blow. If it burns only with maximum brilliancy the filament voltage is correct. Use a bulb suitable for the voltage to be tested.

"B" Eliminator Delivers 90 Volts for 1 and 2 Tube Sets



Follow the circuit above in hooking up your "B" eliminator. Note that no step up transformer is utilized. Adjust output by twisting the rheostat. How the parts are arranged on the baseboard is illustrated in the drawing at the right.

IDEAL for supplying current for one or two tube sets from your 110-volt line is this simple, easily-made "B" eliminator. It delivers up to 90 volts of B power and delivers it smoothly enough for humless reproduction.

Several features of the eliminator are: full wave rectification; no step-up transformer needed; cost surprisingly low.

Any three-element tube may be used, such as the '01A, '99, '30, etc. If '99's are used, the filament may be hooked in series to obtain the correct voltage. For other tubes, however, except, of course, the six-volt ones, a rheostat must be used to obtain correct voltage.

Almost any filter condenser you have on hand may be utilized. If you have to buy one, it is advisable to get a 2, 4, 6 or 8 mfd.

The transformer is of the 6-volt bell-ringing type and furnishes the juice for the filaments. If you have an old audio frequency transformer on hand, you can use that as a choke.

Follow the circuit shown in the drawings above. When arranging parts on a panel let your judgment be your guide. Solder all connections, making them firm as possible.

This "B" eliminator unit costs no more than a good "B" battery and it will never wear out. Fifteen-cent lamps will suffice in the primary of the bell-ringing transformer. Sometimes best results are obtained by inserting light bulbs of different wattages. Experiment a little on the matter.

As long as the vacuum tubes light brightly they are sure to be good enough for use on the rectifier. When the job is completed plug the bayonet prong plug in a wall outlet and hook up the binding posts marked B plus and B minus to their respective binding posts on your receiver.

If you experience any trouble with a hum in the receiver, try another audio transformer and a new pair of filter condensers. To regulate voltage of your eliminator, twist the rheostat.

Wires Wrapped in Cellophane Make Neutralizing Condenser

CERTAIN pentode tubes such as the 247 are difficult to neutralize because of the very small grid to plate capacity of the tube. Usually two pieces of twisted wire a couple of inches long or so are sufficient, but the method is far from satisfactory from a mechanical standpoint. Here is a better way and one that is adjustable.

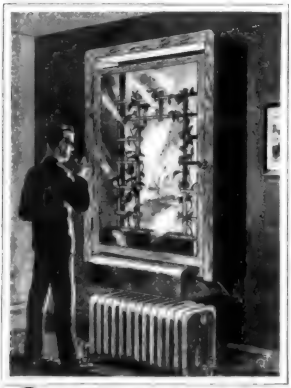
Bare the neutralizing circuit wires for about 3 in. and file the ends to a blunt smoothness. Now carefully remove the cellophane wrapping from a pack of cigarettes and cut it into a rectangle about 3½ inches square.

Roll one wire up in it for about half its width and then roll the other wire up in the remainder but in the opposite direction. Then roll the halves up until they meet and clamp them close together with a couple of elastic bands. The cellophane will form an effective insulation, yet allow the two wires to be slid in and out thus varying the capacity of their surfaces.

The condenser has a very small capacity and has proven exceedingly efficient as a neutralizer.

Adjust capacity of condenser by sliding the wires in or out.

Window Greenhouse Shows Summer View During Winter



HERE is an attractive "winter garden window" which can be built with little labor and expense on any window located over a radiator or hot-air register.

With a supply of artificial heat in addition to the sunshine coming through the double-paned window, it is possible to grow semi-tropical plants. A flowering vine growing over a light trellis, as shown, makes a pleasing effect.

Having selected your window, build out a box-frame or extension which will be about eight inches between outer and inner sash. Make a double-paned window for the outside, as shown in the detailed sectional drawing, and see that it fits the frame snugly so there will be no cold air drafts coming in. The double-pane with dead-air space between is a splendid insulator against the cold.

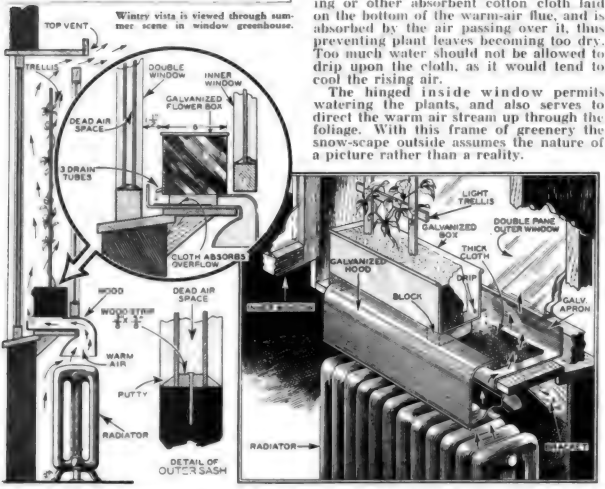
Flue Conducts Heat to Plants

On the extended sill install a warm-air hood and flue of galvanized iron made as shown in the perspective drawing. The galvanized soil box sets over the flue on wood blocks.

Three short pieces of tubing are soldered into the soil box to carry off excess water. This drips upon a piece of toweling or other absorbent cotton cloth laid on the bottom of the warm-air flue, and is absorbed by the air passing over it, thus preventing plant leaves becoming too dry. Too much water should not be allowed to drip upon the cloth, as it would tend to cool the rising air.

The hinged inside window permits watering the plants, and also serves to direct the warm air stream up through the foliage. With this frame of greenery the snow-scape outside assumes the nature of a picture rather than a reality.

Wintry vista is viewed through summer scene in window greenhouse.

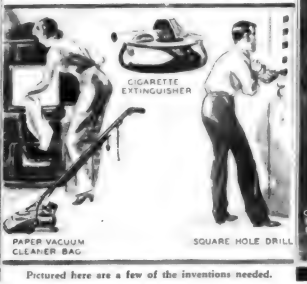


Warm air from plants is conducted up to window greenhouse through hood, as seen here. Double-paned window excludes exterior cold. Excess water from plant box drips onto cloth to moisten air to plants. Note how air passes out at the top.

FORTUNES *in Needed Inventions*

by **RAYMOND F. YATES**

Editor's Note: Questions of readers desiring advice on how to secure patents, on methods of procedure, or on ideas for inventions, will be answered when such requests are accompanied by a stamped, self-addressed envelope. Never send models as they cannot be accepted. Address inquiries to Patent Editor, Modern Mechanix and Inventions, 529 South 7th Street, Minneapolis, Minn.



Pictured here are a few of the inventions needed.

THE march of progress and recovery is going on at a merry pace nowadays and inventors throughout the entire land are cashing in on their ideas. We have before us a heyday of invention the like of which we have never before experienced, and there is no time to be lost.

Windy Weather Cigarette Lighter

A cigarette lighter that will operate in a high wind without appearing clumsy or being unduly heavy. It should be very similar to the conventional lighters and the wind shield should be brought into the proper position only as it is needed.

Cigarette Extinguisher

Who can invent an ash receiver for cigars and cigarettes that will instantly extinguish each butt and that will not use any liquid of any kind? The cigarette should be extinguished by suffocation alone. The lad who can find the winning answer to this little puzzle will have a hard time finding out what to do with all his money.

Paper Vacuum Cleaner Bag

A vacuum cleaner provided with a paper bag into which all of the dirt passes and which may be removed without trouble or fear of disturbing the contents. The bag and its contents could then be burned. The patentable feature of such an article would have to lie in making the bag very accessible to the operator and in sealing the bag within the cleaner before it would be removed for burning.

Square Hole Drill

We still have with us the problem of the square hole. There is urgently needed a "drill" of some sort that will cut square holes in wood. Furniture makers the world over would be glad to take advantage of such a device and the inventor would be assured of a very substantial royalty.

Cheap Emergency Raincoat

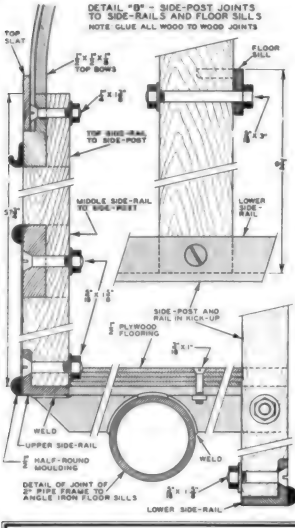
If a cheap raincoat could be put together from some special material and made to sell from ten cents to a quarter, millions could be sold in the United States every year. Naturally, it would only be expected that the thing could be worn once, nor would it need to be a coat. It could be some form of cape so long as it protected a person from the unexpected shower and did not appear ridiculous.

Accident-proof Trailer Coupling

Those inventors who have a penchant for auto-camping realize that there is *badly* needed a fool- and accident-proof coupling for automobile trailers. The problem simply amounts to this: the coupler must be able to withstand a large number of road shocks, it must be easy to

(Continued on page 141)

"Wanderer" — a Two-Wheel



"Wanderer," the king of trailers, represents the last word in luxury on wheels. Sturdy as an oak, she'll stand the hardest traveling without a creak. Four passengers can ride comfortably in her quarters.

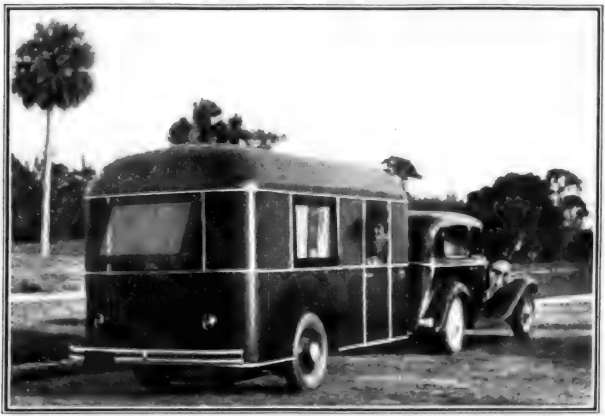
HUNDREDS and hundreds of requests have come to MODERN MECHANIX AND INVENTIONS' blueprint department for a trailer that would accommodate comfortably three or four people on a cross-country jaunt—a trailer that would be a veritable hotel on wheels, filling all traveling needs.

This trailer, which its designer has dubbed "Wanderer," is the answer to those requests. It couples to any passenger car

Top left. Fig. 1 drawings. Below—"Wanderer" on the road. Top right, front view of framework, showing the coupler.

Cabin TRAILER

by E. S. PURDOM



"Wanderer" all completed and off on a cross-country jaunt. She is safe at all speeds, for her center of gravity is kept low. Width is 67 in., length is 144 in.

in a few moments, and pulls with remarkable ease. It is the most economical means of traveling, for with it you eliminate hotel and restaurant bills and you can stop when and where you like, regardless of weather conditions.

This trailer car is safe at all speeds, for the center of gravity is lower than in the average car. The width is 67 inches, which is two inches less than a small auto; the overall height is surprisingly low; the length is 12 feet, or two feet less than a small car.

As for equipment, it has 32 cubic feet of cabinet space including a 3-foot refrigerator, a sink, running water, gasoline stove, racks for dishes and cooking utensils, a dressing table, three-quarter bed and a pullman type berth, a large folding table, radio and two complete lighting systems, 6 and 110 volt. What more could you want?

"Wanderer" is designed to be as light as possible at no sacrifice in strength, in fact, the weight complete is only 1,225 lbs. Keep this constantly in mind when building car, for this is one of the principal reasons why I cannot recommend too strongly that you follow the construction plans exactly.

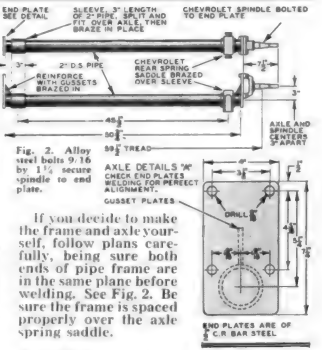


Fig. 2. Alloy steel bolts 9/16 by 1½ secure spindle to end plate.

If you decide to make the frame and axle yourself, follow plans carefully, being sure both ends of pipe frame are in the same plane before welding. See Fig. 2. Be sure the frame is spaced properly over the axle spring saddle.

BLUEPRINTS FOR "WANDERER"

A complete set of large-size blueprints for "Wanderer" are available from Modern Mechanix and Inventions for $1. These plans, made on durable paper and ideal for workshop construction, are made directly from the originals. Included also is complete bill of materials. Modern Mechanix and Inventions Blueprint Department, 529 So. 7th St., Minneapolis, Minn.

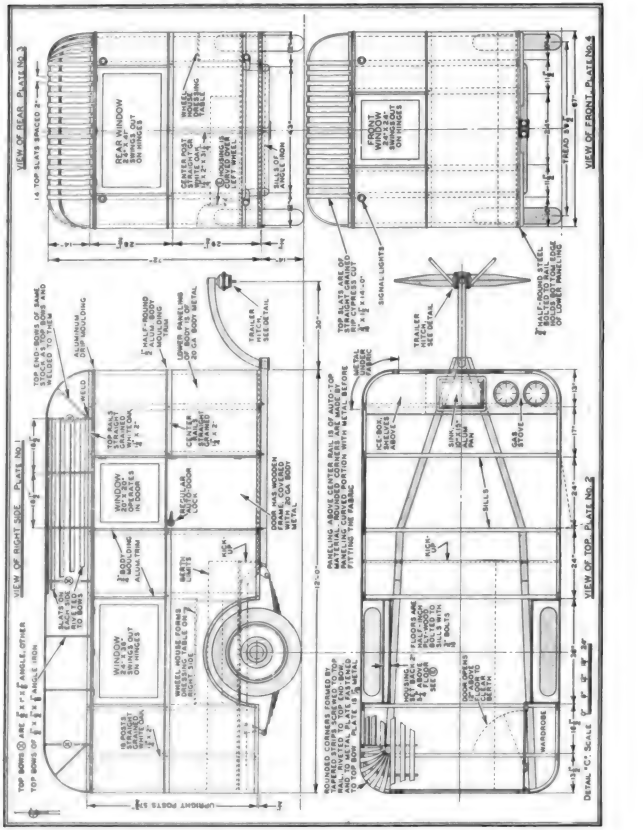
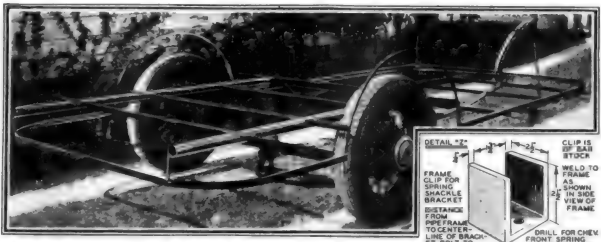


Fig. 3. Uprights and side rails of the body are straight-grained white oak, all of 1½x2 in. stock. Glue all joints and check for squareness and alignment before the glue sets. To fasten corners in place use 2x⅛ in. steel plate 6 in. long, screwed to each end. Side panels are 24 gauge auto body metal. Drawings also show arrangements of interior furnishings. Note that two tiers of bunks occupy right side, while cooking equipment takes up front section. Roof is covered with tan awning material, with auto top material stretched over that. Note that regular auto door locks are utilized. They can be taken from an old car.

Floor Dimensions of "Wanderer" 67x144, Smaller than Ordinary Car

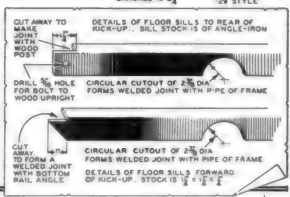


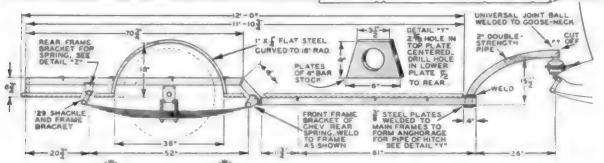
Here's the chassis ready to take the body. It's advisable for you to have local welding shop do the frame and axle assembly job. Cross-pieces are seen in drawings at right.

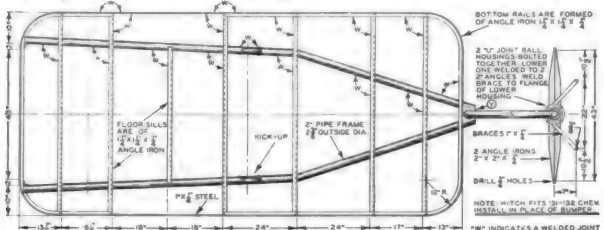
V out the lower side rail angle to make corner turns. Get a piece of sheet metal and make a template to check these turns, as they must be exact. Do not use galvanized pipe or angle.

Fumes from the zinc are dangerous and you can get a better weld on black steel. Drill axle end plates before welding. After aligning plates carefully weld them in place.

(Continued on page 123)



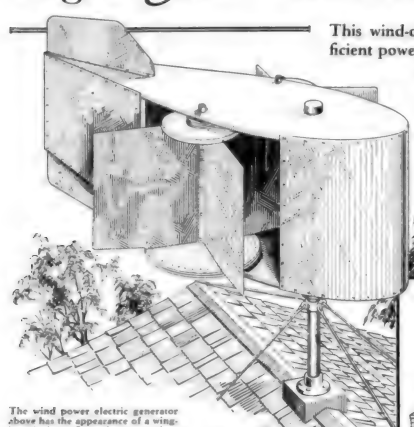




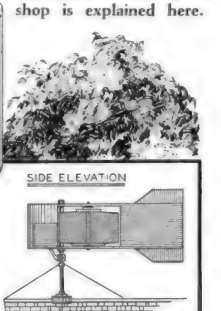
Have welding shop follow these plans when assembling the frame for the chassis. Wheel is located at point which makes riding easy, putting little weight on coupler. Biggest job here will be to get perfect alignment of frame and cross-pieces.

Light Your HOME With

This wind-driven motor provides sufficient power to generate electricity for an average six-volt light circuit. Its simple construction in the home shop is explained here.



The wind power electric generator above has the appearance of a wingless airplane. It can be mounted on a roof or a pole. The two rotors which operate an old automobile generator can be plainly seen. The fixed rudder vanes keep the motor headed into the wind. At the right is a side view of the windmill mounted on roof.



TWO rotors in this novel but practical wind-powered electric generator provide twice the power of an ordinary horizontal windmill.

The body of the wind motor follows closely the streamline shape of an airplane fuselage. On each side are the projecting vanes of one of the rotors. The vanes of the two rotors interlock "gear-wise" within the body and are synchronized by simple, home-made gears.

The flow of air is diverted by the nose of the wind motor and brought directly to bear upon the projecting vanes. A motor with vanes approximately 26"x26" square will operate the six-volt generator, located within the nose, at battery charging rate in an ordinary breeze.

Wood Frame Covered With Sheet Metal

Specific dimensions are not given in the drawings or this article to permit variations to suit the builder. A body 10½" long, 30" wide and 30 to 36" high will be found suitable for rotors with vanes 26" square.

The side and top view drawings show the body construction. A wooden frame is built first. This is covered with light sheet metal, except for the rotor openings and the door which permits examination of the generator.

To permit the body to swing freely in the wind, a 2½" iron pipe is passed through the center line ahead of the rotors. It is held in place, as shown, by a pipe cap at the top and a pipe nut at the bottom.

Iron Pipes Are Used for Rotor Hubs

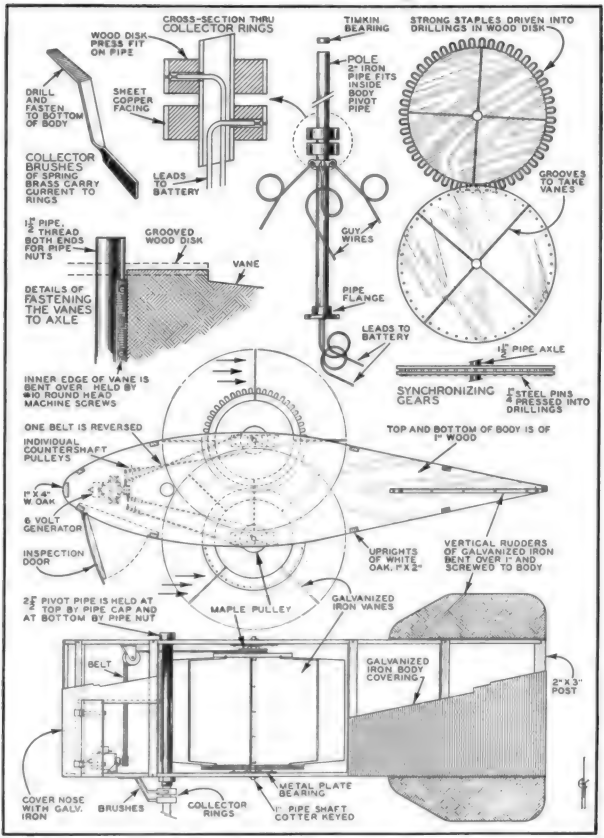
A smaller pipe is fitted in this pipe to act as the supporting shaft. A discarded bearing used at the top of the shaft will allow the body to turn easily in the wind.

The collector rings are mounted on the supporting shaft as shown in the drawings. These are merely wooden discs faced with sheet copper. The brushes are strips of spring brass fastened to the underside of the body and bent to form good contact with the rings. The cross-section drawing of the collector rings shows how the leads run through the supporting shaft to the battery.

The hubs of the rotors are of 1¼" iron pipe. The vanes, cut from 12 or 14-gauge galvanized iron, are fastened to the pipe axle with machine screws. The upper edge of each vane fits into a slot in a wooden disc. A maple pulley, turned on a lathe,

(Continued on page 127)

This Windmill Generator



Construction details of the twin rotor windmill generator are given above. The rotors are synchronized by simple gears. One of these is made by pressing steel pins, equally distant apart, in a slot in a wooden disk. The other gear merely consists of staples driven into a disk. The 6 volt generator is housed in the nose of the motor as shown above.

Be a Character Actor—Here's the Makeup

Successful character acting depends on skillful use of grease paint and a study of the character to be portrayed.

On the left the actor is making up to take the part of a negro comedian. On the right the completed happy-go-lucky, ever smiling "negro" is ready for the stage.

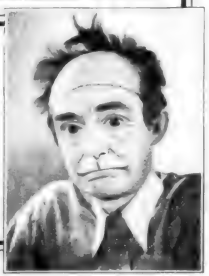
Burnt cork in paste form is rubbed on the face, except for a wide area around the mouth which forms the everlasting smile. White grease paint, supplied in large sticks and rubbed into this area makes the mouth stand out. The white stick used under the eyes gives them that twinkling expression.

Above to the left the actor is putting on wrinkles and other lines with small tubes of color, called "liners." In center the country boy is made up of flesh color grease paint, over a layer of cold cream, and a little red "liner" rubbed into the cheeks and on the lips. Black "block out" wax produces the missing tooth. The comedy farmer on the right is made up with a ruddy ground tone lined with blue on the forehead, around the mouth and the corners of eyes. Eyebrows are bushed out with white paint.

Deep blue lines and blue color, well rubbed in the cheeks to give them a sallow appearance, produced the miser on the left. The lines of the mouth are widened with liner on a pointed match stick.

The half-bald Irish wig on the character to the right is slipped on the head and the joining on the forehead hidden with a thick application of grease paint.

Cold cream forms the basis of makeup. The "ground tone" grease paint, which comes in sticks, is rubbed over it. When the makeup is complete, powder dusted over it will remove the shine. False whiskers are attached with spirit gum.

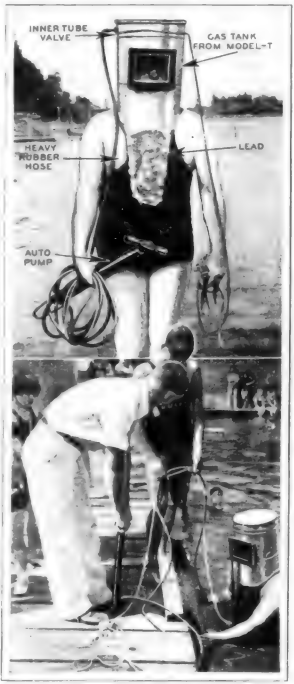


Explore Bottom of Lake With This Novel Diving Helmet

DESCENT to a depth of twenty feet, where you can stay submerged as long as fifteen minutes, is the thrilling feat you can perform with the unique diving helmet shown in photo at right.

The helmet is rigged from the gas tank of a Model "T" Ford. Air is supplied through a valve taken from a tire tube and attached to the top of the helmet. The air line is common rubber tubing long enough to allow the diver free movement. An ordinary tire pump furnishes the air supply.

The helmet is weighted down with lead and fits snugly over the shoulders, the air pressure keeping out the water.



Above photos show a unique diving helmet ready for use. The builder has stayed under water for fifteen minutes.

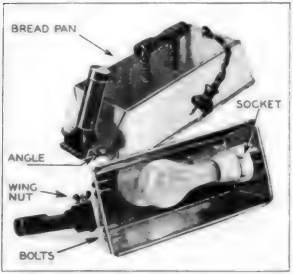
Cellophane, Sub for Tail Light

Sheet of red cellophane is an excellent temporary substitute for broken tail light lens.

MANY automobile accidents are caused by broken tail lights. Motorists should check up on this item frequently. Red cellophane or, for that matter, any other red translucent material makes an excellent temporary substitute for a broken lens.

Simply cut a large enough sheet to wrap around the lamp housing and fasten it in place with a rubber band, cord or wire. The cellophane keeps out water and dirt in addition to giving the proper color protection.

The cellophane will serve as a substitute until the glass is replaced.



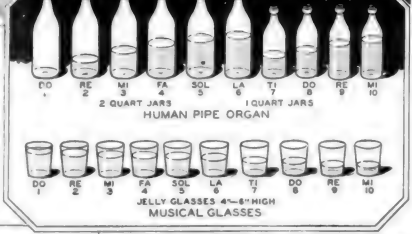
Above photo shows top and bottom views of an improvised flashlight bulb which is made from a common bread pan.

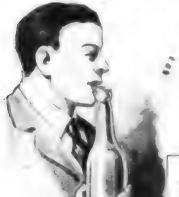
Camera Light From Bread Pan

A HIGHLY efficient reflector and bulb holder for taking flashlight pictures may be made from a bread pan. The light socket is attached to one end of the pan with solder and holds the globe, as shown in photo at left. A short handle is fastened to one end by means of angle irons and bolts. The bottom of the pan has another handle, but this is used mainly to keep as a reel for the lamp cord when the bulb isn't in use.

FREAK Musical STUNTS

The "Human Pipe Organ" tuning up for a rendition. Gallon jars play bass, while pop bottles play soprano.





Left—How tones are played on "Human Pipe Organ." Place the lower lip against mouth of bottle, expel air as if whistling. Needs little practice.

To play the musical glasses tap the rims with the mallet shown here. Unusually clear and resonant tones are produced for amusement of your guests at a party. The glasses should rest on some soft material such as a towel.

Bottles in "Human Pipe Organ" and tumblers in musical glasses stunt are tuned by pouring in water. The higher the water the higher the tone. Your favorite songs can be transposed by giving each note a number.

FOR parties, picnics, and all such gatherings where entertainment is the outstanding feature, there's nothing that furnishes quite so much amusement as a freak musical rendition. And if you're the person who can keep the crowd amused you'll be the hero of the day.

A number of simple tricks in music which you can master with a little practice have been devised by Dr. C. C. Wiedemann, a prof at the University of Nebraska. Not only can you liven up a party with these stunts, but, if you're good enough, you can earn a few extra shekels to help balance the family budget.

One of the easiest musical tricks to perform is to "produce music from a felt hat." All you need is a rubber doll that squeaks, a violin bow and a felt hat borrowed from the audience.

With a little sleight of hand put the doll into the hat and under the thumb of the left hand in such a way that when the pressure of the thumb against the doll is released the doll squeaks. Then put the bow up to the brim of the hat and, holding it

Make Fun and PROFITS

A startling musical novelty is the "cat's meow." Scour the neighborhood for an assortment of felines with yowls of pitches suitable to form the scale. The inset shows what tails to twist to get notes for the song "Home Sweet Home."

Prof. Wiedemann playing his marimbaphone. Musical bars are made of glass, resonating chambers of pasteboard tubes and shellacked well.

Music is produced mysteriously from a felt hat when you draw a bow across it as shown, at the same time releasing the rubber doll.

there a moment, say: "Sing to me, hat! sing to me!" Then draw down the bow, at the same time releasing the thumb pressure on the rubber doll. The result is a squeaking sound that mystifies your audience. They can't understand how a bow drawn across a felt hat produces such tones.

"Music on the head" is a funeful oddity which may be accomplished much easier than one would think. This music is produced by tapping on the top and near the front of the head with a specially constructed mallet.

Materials needed to construct the mallet are illustrated in an accompanying drawing. Bore a one-fourth inch hole through the center the length of the cork and then glue one end of the twig into the hole. Next wrap the cork very tightly with the twine until the ball formed is between 1¼ and 1½ ins. in diameter.

The throat and head cavities are adjusted to accommodate the many tones of the singing voice in order to accomplish this trick. Immediately after the muscles of the throat are adjusted to accommodate a tone, the top of the head is tapped with the mallet.

(Continued on page 121)

For this "music in head stunt" wind hammer head into a ball with string and strike on frontal section of your cranium. At same time adjust voice box to produce tones you want.

Handy Rig for TREKKING

The boat is slid off the trailer into the water in the manner illustrated above. When it is desired to put the boat back on the trailer the latter is run out into the water to the necessary depth and the boat floated onto the cradles. Correct position for best equalization of weight is indicated by markings on the sides of the boat. When loading the boat on land you need only lift the craft a few feet to set it in the cradle.

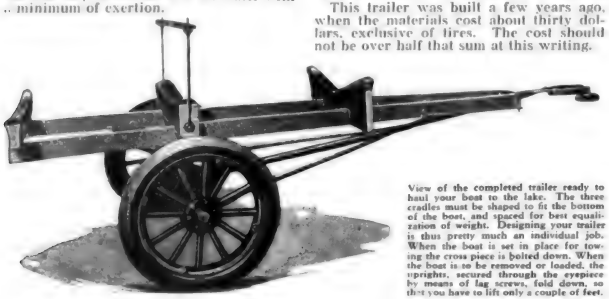
by **DICK WOOD**

A TWO-WHEELED boat trailer is the best solution of the problem of transporting a medium-heavy boat, say one weighing between one hundred and three hundred pounds. The boat does not have to be lifted more than three feet from the ground, which is not much of a strain on two men, even if the boat weighs 300 lbs.

If the boat is heavy, the trailer can frequently be backed into the water, so that the boat may be slid off into the water with a minimum of exertion.

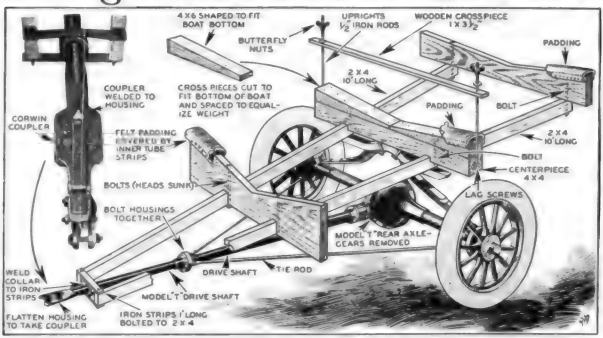
As illustrated herewith, I made a boat trailer from parts of an old T-model Ford and a few dollars worth of lumber and hardware that is preferable to most boat trailers I have seen on the market. For instance, having used a rear axle (stripped of the gears) it has sufficient weight to insure good road holding qualities with a light boat. It tracks perfectly at any speed, is padded and form fitted to the craft, and does not have to be lifted over standards.

This trailer was built a few years ago, when the materials cost about thirty dollars, exclusive of tires. The cost should not be over half that sum at this writing.



View of the completed trailer ready to haul your boat to the lake. The three cradles must be shaped to fit the bottom of the boat, and spaced for best equalization of weight. Designing your trailer is thus pretty much an individual job. When the boat is set in place for towing the cross piece is bolted down. When the boat is to be removed or loaded, the uprights, secured through the eyepiece by means of lag screws, fold down, so that you have to lift only a couple of feet.

a Light-WEIGHT BOAT



All details for construction may be found here. Specially bought Corwin coupler welds to tongue, which slides in collar.

An approximate estimate of present cost would be five dollars for junk-shop auto parts; five dollars for lumber, No. 1 grade, and hardware; five dollars for coupler and blacksmithing necessary to attach it. Suitable tires, tubes and rims may be purchased from used stock at $2.50 each.

If preferred, a trailer may be built over a front axle, after the manner of the commercial job, illustrated herewith. It will be lighter and perhaps entirely satisfactory for light boats, besides being more adaptable for a camp, or general purpose trailer, by putting a bed on the frame work.

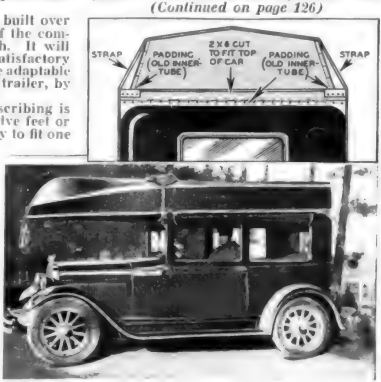
However, the trailer I am describing is particularly suited for boats twelve feet or longer, and, being built especially to fit one boat, it will prove more satisfactory for that purpose than a combination for dual purpose trailer.

First, strip the rear end of the model "T" housing of gears. Before buying note that the axle is in good condition and the wheels unwarped and free running. An extra driveshaft housing will be needed to provide sufficient length. Have it cut in the right place, after determining the length of your trailer, and have a blacksmith devise a means of attaching your coupler device.

The cheapest way around this problem is to flatten the housing where cut, and drill a hole for a ⅝ inch bolt. However, one of the patented couplers are much more satisfactory, and may now be secured as cheaply as three dollars. The coupler will need to be welded to the end of the housing.

The two housings may be bolted together at the point where the tie rods come together. While I have used my trailer with-

(Continued on page 126)



A light-weight boat may be transported on the top of your sedan by means of a special cradle that straps down firmly as seen in the photo above. Pad both edges of the crosspiece to protect the car top and boat edge.

Fool Your Friends With a Magic Color Producing Bottle

This magic bottle produces different colors very mysteriously. Bottle contains a chemical that changes color when poured into glasses which have been prepared beforehand.

MYSTIFY your friends with this trick experiment of pouring different colored liquids from a magic bottle. The secret of the trick lies in the fact that the bottle contains a solution of iron chloride which reacts chemically with the solutions that are secretly placed in the beakers before the experiment is to be performed. These solutions are practically invisible due to the small amounts utilized.

The following list of chemicals are used to produce the colors with the iron chloride (diluted 1 part with 10 parts water): Potassium ferrocyanide, blue; Sodium ferricyanide, green; Ammonium thiocyanide, red; Tannic acid, black. A golden yellow color is produced by merely pouring the iron solution into an empty beaker.

Interest may be heightened by using added movements of the hands and hocus-pocus words by the performer.

Wheel Makes Unique Chandelier

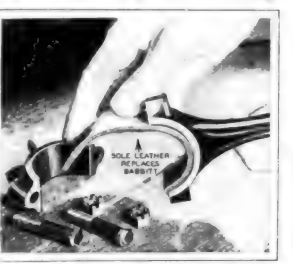
PEOPLE who have rooms in their homes built after the old rustic style, with bare oaken beams, etc., sometimes have considerable trouble finding lighting fixtures that harmonize. One home owner solved this problem by constructing the chandelier shown in the photo below.

An old wagon wheel, complete with hub and spokes, formed the base. The hub points downward for better effect. The light fixtures, one for each spoke, were fastened to the rim of the wheel. The wires were run along the top side of the rim, thereby being out of view from the floor. The wheel was suspended from the ceiling by four dull finished chains.

The completed chandelier, besides harmonizing perfectly with the general idea of the room, is unique and attractive.

This unique chandelier was made from a wagon wheel.

Cars Run With Leather Bearings



A leather strip makes a good substitute for a burned out main bearing. Above photo shows one being put in place.

MOTORISTS will do well to remember the following repair stunt for a burned out main bearing or connecting rod. Leather can be used as a satisfactory substitute in place of babbitt. Of course, the repair is only of a temporary nature, although cars have been driven several thousand miles with one or more leather bearings.

Cut pieces of heavy sole leather to fit in place of the damaged bearing, soak them in oil and bolt into position, as shown in illustration at the right. The automobile could then proceed to a garage where permanent repairs can be made.

Man-made Fever Cures Insanity

ARTIFICIAL fever, produced by electric currents, will cure paresis, a type of insanity formerly considered hopeless, according to Dr. Ralph H. Kuhn. Fevers as high as 108 are induced, the Illinois mental specialist said.

Defend Yourself by Police Methods

Baffling the hold-up man. A quick movement of the left hand pushes the gun aside, while at the same time a fast right to the chin puts the thug out of commission.

How to escort a crook to the calaboose. As demonstrated, slipping your arm between his upper left arm and side, grasp the felon's hand from behind and pull it over against his wrist until he is willing to go quietly. At the slightest sign of resistance simply press the hand more tightly against the wrist and the captive will lose all his resentment.

When an assailant makes a pass at your chin, the most effective first move in a counter-offensive is to grasp his wrist, following up with next step, indicated by arrow.

Second move in overcoming an attacker. Thrust his arm upwards and at the same moment place your leg behind his, as shown above.

An opponent of larger bulk, taken suddenly from the rear, can be brought quickly to the ground by grasping his collar from behind and pushing on the inside of his knee with the right foot, as demonstrated here. This method of attack throws enemy off balance, rendering him helpless.

Final disposition of assailant. With your left wrist thrown over his right upper arm, bend his lower arm over till he howls enough. Known as the "bone crusher," this grip causes excessive pain and throws your attacker off his balance, putting him temporarily out of order.

Plants Thrive Indoors Under Lights From Ordinary Bulbs

Flowering and foliating plants thrive under 18 hour a day application of artificial light. Three sixty-watt lights grew the plants above; one 10 watt lamp is used at left.

THE old theory that house plants must be kept close to windows if they are to thrive has been put to rout by experiments which revealed that the plants, when treated with artificial lights, may be kept anywhere indoors that fancy dictates and still retain their vitality.

Relatively low intensities of lighting, in addition to a little daylight, will keep the plants in good condition. In the experiments most plants were found to prosper with 16 to 18 hours illumination in every 24.

The photo at the left shows how you can apply artificial illumination to plants supported by a floor lamp standard. Only three sixty-watt lights are utilized.

The single hyacinth shown in the inset is illuminated by a 10-watt lamp with a shield in front of it, lamp and shield being supported on a pike.

Battery Charger, Garage From Junk

THE battery charger shown below, with its single windmill blade hewn from a small cottonwood log, was made by Fred Beck of the Little Missouri river badlands at no expense. He also made the garage by hand from logs picked up on the river bottoms. The metal parts of the battery charger came from the scrapheap, but the affair is so successful that it keeps Mr. Beck's automobile and radio batteries completely charged. He plans to make a larger outfit for lighting his house.

Old logs, junk parts made this garage with battery charger.

A Cute Cage For Your Pet Fly

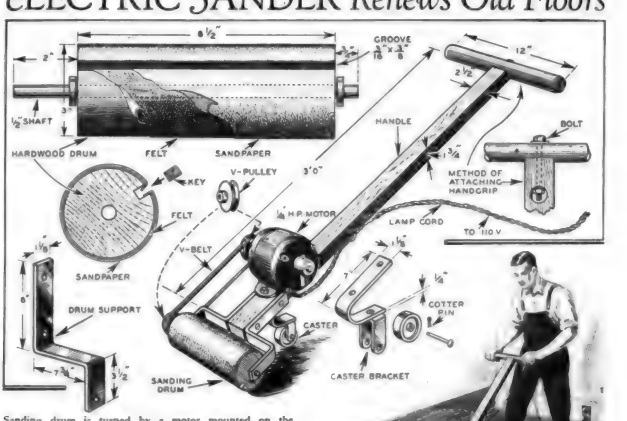
Bars of cage to hold your pet fly are made from pins sticking up through the floor and out through the conical top piece

HOW would you like to have a pet fly in your home? If that idea strikes you as particularly attractive, well here's a cage in which you can incarcerate your pet.

The standard is made from a piece of wire, bent as illustrated in the drawing. As for the cage, all you need is some pins and a cork.

Cut a small disc off the bottom of the cork to form the floor of the cage, then cut the conical piece to make the roof.

ELECTRIC SANDER *Renews Old Floors*



Sanding drum is turned by a motor mounted on the handle. Note that a layer of felt covers the drum. Key allows old paper to be removed and new sheet set in place.

IT IS sometimes desirable to recondition floors in older houses to give them a new and attractive appearance. This is especially true where thin veneer flooring is used.

The home-made sander shown here is made in the home workshop and does the work of sanding down old floors much easier and faster than it could be done by hand. The motor employed can be temporarily borrowed from the washing machine.

The handle for this sander is made from a strip of hardwood according to the dimensions shown in the sketch above. Two metal brackets made of heavy strap iron ⅛ in. thick and 1¾ in. wide are bolted to the lower end of this handle to support the sanding drum. A "T" cross handle is attached to the upper end as shown to afford a firm hand grip.

The drum is the most important part of this sanding machine. It is made of hardwood and must be perfectly round and true, otherwise the machine will jump and vibrate.

The drum must be turned on a lathe after the shaft is installed. The exact size of the drum will depend upon the size of the sheet abrasive to be used. A drum 8½ in. long and 3 in. in diameter is the right size for sheet abrasives of standard size.

The drum is provided with a groove and a wood key which fits into this groove to hold the ends of the abrasive paper, which has been wrapped around the drum.

The surface of the drum is covered with felt to provide a hard cushion back of the abrasive.

The ½ in. diameter drum shaft is a tight press-fit and does not have to be keyed. The shaft projects 2 in. at the pulley end and ⅝ in. at the other end. Space rings are used on the drum shaft to keep the drum from rubbing on the metal brackets.

The motor is attached to the upper side of the handle in the position indicated. A 2-in. pulley is placed on both motor and the drum shaft. These pulleys are "V" type and an endless "V" type belt is used to drive the drum.

A caster is attached to the under side of the handle to carry part of the weight when the sander is in use and to move it from place to place.

In reconditioning old floors the varnish must be first removed with varnish remover, otherwise it will clog up the abrasive very quickly.

When sanding floor, pressure of drum against floor is controlled by raising or lowering the handle as required. A rubber-tired carpet sweeper wheel makes good caster wheel.

Electric Heater Warms, Decorates Rooms

THE ordinary electric heater with the circular reflector is so obviously a heater that it is not a very decorative fixture. Herewith is illustrated a heater that fills the bill where ornamentation is desired, and in addition keeps a room comfortably warm on chilly fall and early winter evenings.

The frame work of the heater is seen in the accompanying sketches. Any heat-resisting, non-electrical conducting material suitable for end pieces, particularly "sheet rock." Slate or asbestos shingles will also suffice.

One-fourth inch rods passing through 12 inch lengths of ½ inch pipe serve as spacers. The core of the heating element consists of two 6 inch tubular porcelain insulators, obtainable at any electric supply store.

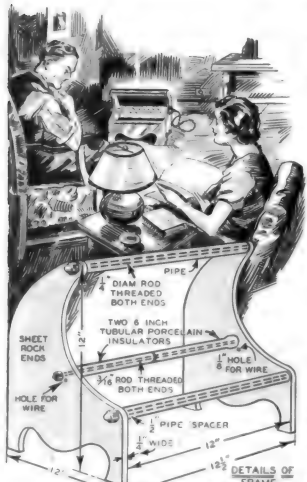
A continuous sheet of polished copper shaped as indicated forms the reflecting surface. Note that it is folded back over the top.

The heating element, of course, is nichrome wire, which may be purchased at electrical supply store coiled in lengths of pre-determined wattage. Wattage of any of these heaters can run anywhere from 750 to 1500 watts.

Coiling the heater element on the porcelain tubes offers something of a task. Note in the drawing how the closed coils of the heating wire are only on the side of the insulator facing the reflector. The input wires connect one to the right end of the heater element and the other to the brass rod passing through the tubular insulator.

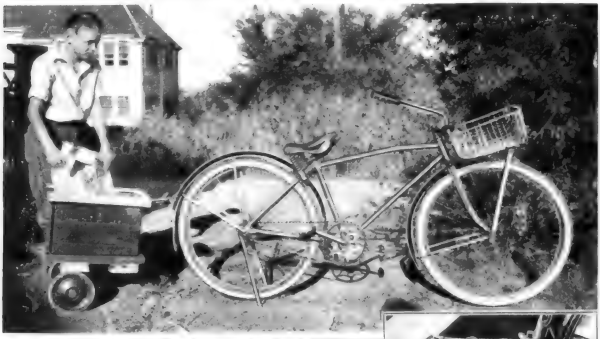
While the fundamental design of the heater is given here, the contours can be altered to harmonize with the furnishings of the room. The heater can be painted, or enameled, with bronze or aluminum for ornamental effect.

The reflecting surface should be kept highly polished at all times.



Suggested dimensions for heater are seen here, but you can, of course, alter them to suit your own taste and requirements. Note that the heating coils face the reflector, which should be kept polished at all times for maximum heat.

Build a Sturdy TRAILER for Your Bike



Shown in illustration above is a neat little bike-trailer which attaches to the rear mud guard and permits carrying loads too large for a handlebar basket. The close-up at right shows the attachment feature in place.

SMALL retail firms whose customers' purchases do not warrant the use of a motor car find it more economical to hire a part-time boy and his bicycle to do their work. Often such boys meet up with the problem of overburdening loads. This may be overcome by constructing the following easy-to-make bike-trailer which is shown completed in the above illustration.

The trailer attaches to the rear mudguard and permits transporting loads too large or too heavy for the conventional handlebar basket. The cost is negligible and the construction simple.

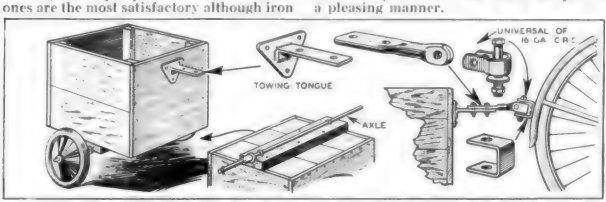
The first step is to locate a suitable box to use as the container. Your employer could undoubtedly supply you with one. You may wish to reenforce it, making it durable enough to insure the safety of anything you may be called upon to transport.

Next, hunt up a pair of wheels. Rubber ones are the most satisfactory although iron or wooden wheels will give good performances. These may be taken from a discarded wagon or pushmobile.

The axle should be of strong iron and attaches to the wooden container as shown in the drawing at bottom of page. The towing tongue is screwed into the cart and in turn bolted to the universal joint. A clip is then fastened to the rear mud guard and hooked up with the universal joint.

This fitting should permit free movement of the joint. A clearer picture of construction processes may be gleaned by a close study of the diagrams shown directly below.

It is only a matter of turning a single screw to attach or unfasten this little bike-trailer. A paint job to conform with the colors of your bike will finish the job in a pleasing manner.



Constructional details for this handy little bike-trailer are simplified by a close inspection of the diagrams shown above.

A BUNGALOW That's Hard to Beat

Sun porch and 22 windows are features of this "tight plan" bungalow, No. 5-W-11, favored by numerous contractors. Built with stock materials, cost should not run over $5,000.

by MAURICE I. FLAGG

A CONTRACTOR described this plan, No. 5-W-11, as the best frame bungalow he ever saw. Designers call it a "tight plan." People who build the house like it immensely. It may be stretching a point to say that the house "has everything" and offers the most for the money, considering size.

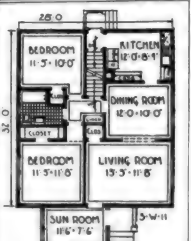
If you'll take time to study the plan you'll agree on one thing, namely, there's not an inch of useless space and there's a concentration of maximum household efficiency in a minimum of space.

It's a small bungalow to be sure, 32'x28', but it includes the equipment most everyone asks for and equipment that provides excellent resale value in the event you should ever care to sell.

There are two bedrooms, a bathroom, kitchen, dining room and sun porch on the ground floor. There's space above for another good sized bedroom and storage. There's a full basement, a warm air heating plant, complete insulation, hardwood floors, tiled bathroom floor, recessed tub, plenty of closet space. Twenty-two windows certainly provide plenty of light, air, cross ventilation and sunshine.

If you are income-minded and wish to rent a room you can place a door between the front bedroom and sun porch. This would permit a roomer to enter without disturbing the family. The sun porch is glazed and weathertight.

For complete blueprints of house illustrated on this page send $1 to Modern Mechanix Home Building Editors, 529 So. 7th St., Minneapolis, Minn. Two new plan books, "Homes for Newlyweds," "16 Selected Homes for Lean Purses," may be had for 15c each, or both for 25 cents.



Floor plan shows unusually convenient arrangement of house No. 5-W-11.

The house is frame construction, shingle sidewalls and shingle roof. Stock materials are used throughout. This means a decided saving.

Now about the cost to build. In round numbers this is a $5,000 bungalow. Costs vary, depending upon equipment and location. In small towns the cost would be less.

Irrespective of cost this house offers as compact a plan as it is humanly possible to design, and that means the least money to build provided you stick to stock materials and average equipment.

This attractive home is one of the hundreds of others for which blueprints are available at MODERN MECHANIX AND INVENTIONS. The booklets mentioned above offer a wide choice of homes, no matter what amount you want to spend. Prompt service on booklets.

"John L." had a FIGHTING HEART

—so has the 1934 HARLEY-DAVIDSON

New TNT motor delivers 36 horsepower—a marvel in air-cooled motor engineering!

JOHN L. SULLIVAN, idol of fight fans the world over, was famed for his punch and fighting heart.

For the same reasons the 1934 Harley-Davidson is the marvel of the motorcycle world.

Just test the "punch" of this 74 Twin. Its marvelous TNT motor is so powerful that hills just flatten out, and miles are but parts of minutes! Like John L. it never knows what "quit" means—a true FIGHTING HEART, the heart of a Champion!

See this great motorcycle. Note its sweeping Air-Flo design, new comfort features, and other 1934 improvements.

Ask the Dealer about his Easy-Pay plans. Mail the Coupon for free literature.

MAIL THE COUPON

Harley-Davidson Motor Co., Dept. MM., Milwaukee, Wis.
Interested in the "Fighting Heart." Send illustrated literature.
Postage Stamp is enclosed to cover cost of mailing

Name_____

Address_____

My age is ( ) 16-19 years, ( ) 20-30 years, ( ) 31 years and up, ( ) under 16 years. Check your age group.

HOBBY DEPARTMENT

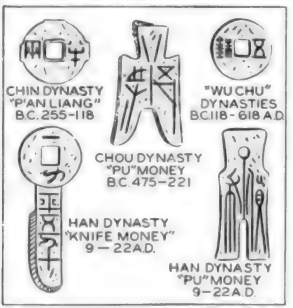
Disarmament Conference Stamp

THE World Disarmament Conference, though it was without noteworthy results, nevertheless produced a number of new stamps which will win favor among philatelists. Most outstanding of the new issues was the Swiss stamp depicting a winged messenger bearing a torch and a triad of oak leaves, as seen above. Further conferences will undoubtedly see appearance of new stamps commemorating peace efforts.

Story of Freakish Chinese Coins

COLLECTING Chinese coins is a branch of numismatics which has not won wide popularity, but which holds possibilities of keen interest, chiefly because of the freak designs of the coins, some of which are sketched below.

The money, you will notice, is given freak shapes. This came about when the Chinese civilization rose from barter to coinage. Shapes of common objects of barter were impressed upon the coins. "Pu" money was traded for pants, knife money for weapons.



Belgian Stamp Honors Piccard

JUST as Einstein has made Germany famous in the scientific field, so has Prof. Auguste Piccard performed a like mission for Belgium. In order to show its appreciation of Piccard's services, the Belgian government has issued a stamp commemorating the famous stratosphere exploit of the picturesque scientist. The stamp may be seen at the right. The giant bag is just beginning its epochal ascent into the black reaches of the stratosphere. Note the tiny figure on the gondola. Though you'd never guess it, this is supposed to be Piccard surveying the scenery around him.

Hunting Down Animal Outlaws

(Continued from page 69)

Williams took with him a bunch of traps, but as the old wolf was known to be trap-wise, the hunter expected to depend mainly upon his rifle. But as things turned out, he required both the trap and the rifle to get the wolf.

When Williams first went into the country where the wolf ranged he tried to get fresh tracks, but without success. He asked some of the men who had lost livestock just where the animal made his headquarters in their section. They replied that he concentrated within a district 40 miles wide and 65 miles long.

Williams' first move was to scent up the soles of his shoes and start stringing out his traps. The wolf got on his trail that night and showed signs of great excitement at what he evidently thought was the presence of a possible mate in his neighborhood.

The hunter laid a trail of the scent entirely around the line and then, returning to Pelgar Mountains, cleared out two old dens and a new one which ran back into the hill for about 50 feet.

(Continued on page 117)

Hunting Down Animal Outlaws

(Continued from page 116)

On the first day of April, Williams had his first glimpse of the wolf, but was unable to get a shot at him. However, the hunter found, to his surprise, that the killer was accompanied by two coyote bodyguards. The coyotes accompanied the old wolf at all times, traveling from 100 to 200 yards on the flanks of their master. They would warn him of danger by taking flight.

For some days Williams did not shoot the coyotes, hoping that he would get a shot at the wolf without having to give him warning. Finally, realizing that there was no chance of getting at the wolf unless the coyotes were killed, Williams shot them, hoping that he now had a clear field.

Killer Scoffs at Traps

In this he was greatly mistaken. The wolf played hide and seek with him and seemed to enjoy the game. After making a kill he would go on some distance, back track for a few rods to a point where he could keep under cover and watch the hunter on his trail. At other times the old renegade took to fallen timber and so could not be tracked.

Twice during May the outlaw stepped in the jaws of traps and on the night of July 3 he rolled into, or lay down on, a big trap and had a lot of hair pulled out. Evidently this gave him a bad scare, for he left the country for some three months.

No sign could be found of him near Custer until the night of August 1, when he made his presence known by killing a couple of head of cattle and wounding several more. Williams located the

(Continued on page 128)

ADLETS FOR HOBBYISTS

STAMPS

STAMPS! 100 diff. 2c; 500 diff. 35c; 1,000 diff. 90c. Tatham Stamps, D9, West Springfield, Massachusetts.

TURKEY, beautiful pictorials, 25 different only 5c to approval applicants. Kent. Box 87-X, Brooklyn, N. Y.

ZANZIBAR! Packet super freakish stamps from Zanzibar, Algeria, Sudan, Malay States, Victoria, Gold-coast, Nigeria, British Colonies, Souamericans. Don't delay! Don't wait. This whopping packet free for 5c postage. Gray Stamp Co., Dept. M.M., Toronto, Canada.

PACKET obsolete BAHAMAS stamps 15 cents. R. Moore, Nassau, Bahamas.

300 DIFFERENT Stamps 15c, 50 African 15c. List free. Approval if required. Michael 942m 23rd Bellwood, Ill.

5 SCARCE triangle-stamps 10c. Albert Gardner, 5220 Cuthbert, Baltimore, Md.

SCARCE Paraguay Airmail, Packet Hinges, Pocket Stamp Album, perforation gauge, watermark detector, packet of stamps—all for 5c to applicants for our Penny Approvals. Penny Stamp Co., 633F Maryland, Glendale, Calif.

SELL me your stamps! Highest prices paid.—Doake, Fresno, Ohio.

COINS

$5 to $500 EACH paid for hundreds of Old Coins. Keep all. Get posted. Send 10 cents for Illustrated Coin Value Book, 4x6. Buying and Selling Prices Guaranteed. Coin Exchange, Box 56, LeRoy, N. Y.

COINS, California gold quarter size 27c; $\frac{1}{2}$$ size, 53c. 3-piece and coin catalogue, 10c. 200 different stamps and stamp catalogue, 10c. Norman Shultz, Salt Lake City, Utah

$10 CIVIL WAR Bill, wood nickel, Mex. coin and list 25c. Koin-Shop, MM-35 S. Dearborn, Chicago.

5 MINT Tannoutouva 5c to approval applicants. (Catalog 25c) References, please. W. B. Hedrick, Ottawa, Kansas.

Become an Expert Accountant

The Profession That Pays

The demand for skilled accountants—*men who really know their business*—is increasing rapidly. The new national and state legislation is requiring of business—both big and small—much more in matters relating to Auditing, Cost Accounting, Business Law, Organization, Management, Finance. Men who prove their qualifications in this important field are rapidly promoted to responsible executive positions—given an opportunity to earn real salaries. The range is from $3,000 to $15,000 a year—even to higher income figures.

Send for Free Book—

"Accountancy, the Profession that Pays"

Why let the other fellow walk away with the better job, when right in your own home you can equip yourself for a splendid future in this profitable growing profession?

Preliminary knowledge of bookkeeping is unnecessary. Our free book on accountancy fully explains how we train you from the ground up, or from where you now are, according to your individual needs. Low cost; easy terms.

The facts about the new LaSalle training in Accountancy and the opportunities in this highly profitable field are clearly outlined in a 64-page book which LaSalle will send you *free*.

The man in earnest to get ahead will find this coupon a most profitable aid to progress. If you have the urge and the will to increase your income, clip and mail the coupon NOW.

LaSalle Extension University

The school that has trained over 1,200 C. P. A's

Dept. 12483-HR **Chicago**

I would welcome details of the new opportunities in accounting, together with copy of "Accountancy, the Profession that Pays," without obligation.

☐**HigherAccountancy**

Other LaSalle Opportunities:

LaSalle opens the way to success in every important field of business. If interested in one of the fields below, check and mail.

☐Business Management	☐Law—Degree of LL.B.
☐Modern Salesmanship	☐Commercial Law
☐Traffic Management	☐Modern Business Correspondence
☐Railway Accounting	☐Stenography—Stenotypy
☐Industrial Management	☐Expert Bookkeeping
☐Commercial Spanish	☐C. P. A. Coaching
☐Effective Speaking	☐Business English

☐Credit and Collection Correspondence
☐Practical Accounting and Office Management

Name .....

Present Position .....

Address .....

I want YOU to try this remarkable Set now-at my expense!

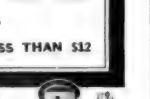
H.D. LUDWIG PRESIDENT

Fordson's New 6-tube Goldentone Actually Outperforms THREE Costly 12-tube Sets

•

SELLS AT LESS THAN $12

Put the new 1934 model Goldentone Super-Heterodyne in your own home 30 days—under our FREE TRIAL offer! Test and compare for distance, for tone, for selectivity. Know for yourself why others write "Fordsons have expensive 12-tube sets!" Yet the dealer's direct price for the 6-tube chassis and dynamic speaker is only $11.95. We can offer you this remarkable value only because we concentrate on one thing—Radio—manufacturing and production—skill and experience on the most high quality household radio. Get the dealer's price on the complete set, ready to play, including 6 latest type tubes and a beautiful matched dynamic speaker. We answer you! Remember, prices are going up so send for it today!



30 DAYS FREE TRIAL

GOLDENTONE SUPER-HETERODYNE 1934 Fordson. Automatic volume control; new Hexode tube; tone control; selective, sensitive; robot to count; 540 to 1,500 kilocycles; quota police call.

BATTERY MODELS for farm use.

LONG WAVE 200 - 2000 meters.

CAR RADIO 6-tube all electric; one point; airplane dial. Installs in 30 minutes. Retail price $39.50 (Set dealer's discount).

$11.95

6-tube chassis and dynamic speaker.

Jack Tramper, New Monico, tells us: "Goldentone gives as much volume as a ——12-tube set, costing nearly $100. We are doing far richer than Henry Ford for quite the money." Capt. Isaac Chaos best Goodwin, Fort Worth, Va. writes: "Goldentone exceed 12 tube set in every way. I also order quite a few more. Many letters from enthusiastic users.

MAKE MORE MONEY!

No try agent. Get our selling plan and more handsome commissions. Two color literature and your cards—name imprinted all FREE. Write me personally today!

FREE

Without obligation, I will send you literature describing your 1934 Fordson. Also your wonderful radio proposition to dealers. Clearly explain how the prices may increase any day. Mail me at once.

Cut or tear coupon direct to me NOW!

H. D. Ludwig, President, FORDSON RADIO MFG. CO.
Dept. D, 11706 Livernois, Detroit, Mich.
Send me the FREE descriptive literature at once.

Name .....

Address .....

AN EASY $5 A DAY

possible with new magic invention that lights gas instantly without sparks or flame. A sure sale wherever gas is used. Retails for 25c.

MYSTERY GAS LIGHTER

Get in on this BIG MONEY MAKER—ACT NOW

Packed in individual cards with instructions. Sample 10c. Rush $5 per gross or $1 per dozen.

NEW METHOD MANUFACTURING CO.
New Method Bldg., Desk MG-19, BRADFORD, PA.

Men Wanted at Once

Make Money Calling on Stores

Now accepting. Pays big money at once without investment. Introduce sensational new line to stores. Sell-o-matic. Permanent repeat business easy. Experience unnecessary. Start free. Write

PRO-CO-PAX
Dept. 37-L
1956 S. Troy
CHICAGO

Plans for "Tahiti"—Sailing Cruiser

(Continued from page 90)

raise the other end to an angle of about 30 degrees, fill with water, light a fire around the lower end, and put in half a dozen frames. Put in another each time one is removed; number the ends so they will come out in proper order after 30 minutes boiling each. That should make them flexible as a politician's conscience, but no fixed rule can be given; some kinds of timber require more and some less, and even pieces of the same species from different trees.

The proper wood is white oak—and be sure it is WHITE oak, quercus alba, and not red oak or any other of the 199 kinds of oak in this country. Up north good rock elm is frequently used for bent frames, and is equal to oak. In the far south the wild mulberry makes the finest of all bent frames, as boat builders learned 4,000 years ago. But you cannot buy it. You have to go into the forest and hunt up a few trees, for they are rather scarce.

Bending Moulds Must Be Fast

The process of making temporary moulds of rough lumber, and screwing battens around them, as shown in the photos, to make a bending form, has been explained in these pages before, and is fully covered in Patterson's book, so I will not repeat. But one secret of success I want to impress on you. Bending must be fast work, because the timber cools and stiffens fast. Gloves for all hands are needed. Also a half dozen or more 8 or 10 inch iron clamps. And a "twister" made of a strong wood bar with a U shaped piece of strap iron bolted at one end, leaving a hole in the U that will just fit the head of frames, so they can be twisted to lie flat against planking towards the ends. Station a husky man inside the framework; pull a frame from the cooker, rush it in fast, and while the inside man pushes it down to place with hands and feet, the outside men draw it snug to the battens and clamp it. In five minutes it will be cool and set. Fasten it with a few screws through battens from the outside and remove clamps for the next frame. Bend in alternately right and left, forward and aft, starting amidship. Be particularly sure the upper ends are spaced equally, the same as the ends on keel.

In the after body, where there is considerable reverse bend at the lower ends of frames, it is necessary to split these ends for several feet, using a very thin blade band saw, with little set. This will make the reverse bend easy. The lower ends of all frames should fit into shallow notches, about ½ inch deep, cut in keel, although lazy men often omit this. In any case, the end of frame must be bevelled to fit keel before boiling.

Now Come the Floor Timbers

Now consider the floor timbers—the heavy transverse members that connect lower ends of frames. It is simple to notch these to fit over keel, being sure the height will be correct according to plan, set them in place against frames, mark the outside, remove and saw to shape, bore bolt holes, put back, continue holes through frames, and bolt up. An angle boring fixture for your brace or drill is handy here, but the job can be done, more slowly, by fitting any ordinary ratchet wrench handle to any auger bit. The drift

Thank You for Mentioning Modern Mechanics and Inventions for December When Writing to Advertisers

Plans for "Tahiti"—Sailing Cruiser

bolts that secure floors to keel are lengths of galvanized iron rod, with a nut screwed and riveted on to make the head. These should be driven at a slight V angle, converging towards the center. Heads, of course, must be countersunk so as not to interfere with laying cabin floor boards. Heels of frames should also be spiked to keel with galvanized iron spikes.

The next job is the clamp—the heavy timber that unites heads of frames. This will be in two pieces, joined in center with a scarph extending over 3 frames, and edge bolted as shown. It is curved and tapered towards the ends for easier bending, according to a pattern of ½ inch soft wood you must first bend in place and shape to fit. Mark each frame with the proper location of the upper edge of clamp, which will be at such height that when deck beams are notched over it ½ inch and deck laid, edge of deck will come exactly to the edge of deck mark you have put on all moulds when they were made. Nothing ruins the whole appearance of a boat worse than an unfair sheer or deck curve, so take the greatest care to get this absolutely correct. When clamp ends are shaped as per pattern, boil them in the rib cooker and bend and clamp in place, letting the center ends overlap. It is then easy to mark on this overlap the exact points to cut the scarph joint. When cold and set, remove, cut the joint, and put them in again, with one 5/16 inch galvanized carriage bolt through each frame, heads countersunk outside, nuts inside.

And when this job is done, knock off work, fire a salute of 21 guns, give three cheers, and serve out a double round of grog to all hands. Because you can consider the job half done. Not in actual hours of work—oh, far from it! But "well begun is half done," and with a good frame to proceed on, all your real difficulties are over. The rest of the job is pretty much straightforward carpentry, presenting no special difficulties. Oh, there'll be plenty of chances to use your bean for a little hard thinking and wise planning, and plenty of tight fits to make you say "Darn!" and other naughty words. But after all, it is only good clean fun. Next month I will steer you through all the harder passages of the finishing operations.

Modified Stock Car Racing

(Continued from page 77)

nite racing flywheel is used. Also the Mallory Racing coil and double breaker distributor.

On the half mile track a 48 ring gear and a ten tooth pinion is about the right gear ratio for this work. One of the most important changes is the new type of racing cam shaft that is used with this equipment, which gives reliable results and will bring home the honors and money.

We might also add that the standard Chevrolet wheels have been giving good results in these races.

The Chevrolet Four can be made very fast by using a three in one drive for the magneto, a pressure oiling system on the crank shaft, special high compression aluminum racing piston, and boring out the cylinder to 3¾ inches.

(Continued on page 120)

A tiny sum invested today—and those precious lives that are in your keeping are made safe by old line, legal reserve life insurance. There is nothing complicated, nothing difficult. The Postal Life Insurance Company which has paid more than $40,000,000 to policy holders and has been known all over the world for 28 years, is now making a timely special offer which no one can afford to miss.

Just think of it. For a premium of only $1.00 per month you may have the protection of sound legal reserve life insurance backed by more than $21,000,000 in assets. Same premium for all ages—18 to 50 both men and women. The policy is written in exact conformity to the stringent insurance laws of New York, carries cash values, paid-up and extended insurance privileges. For this special offer it is modified to reduce the premiums to one-half of the premiums payable after five years.

Consult the table right in this advertisement and see how much insurance $1.00 per month will buy at your age. $2.00 will buy twice as much, etc. Then send the coupon below with the amount to cover your first month's premium. We have no agents. Postal sells only through the mail. You risk nothing. Your money will be refunded instantly if your application is not accepted. Do not delay another hour. Send the coupon below.

$1.00 a month purchases

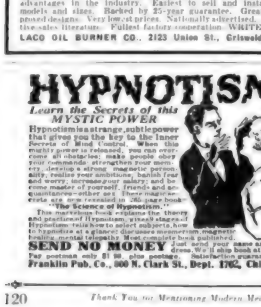
Insur-Age	Insur-ance	Age	Insur-ance
18	$1275	34	840
19	1248	35	813
20	1221	36	786
21	1194	37	759
22	1167	38	734
23	1140	39	708
24	1112	40	682
25	1085	41	657
26	1057	42	632
27	1030	43	607
28	1003	44	583
29	976	45	559
30	948	47	535
31	921	48	489
32	894	49	467
33	866	50	445

Other policies for other ages

SEND $1.00 WITH THIS COUPON

POSTAL LIFE INSURANCE CO.
—Arthur Jordan, Pres.
Dept. 324, 511 Fifth Avenue, **NEW YORK, N. Y.**

I enclose $ ..... for $ ..... worth of insurance.
Occupation .....
Exact date of birth .....
Name .....
Street .....
City ..... State .....



Modified Stock Car Racing

(Continued from page 119)

As the Chevrolet is an overhead valve in the first place, you are permitted to use any special head you desire. The standard Chevrolet rods can be stretched in a special machine as much as one half inch if desired. The Lynite flywheels must be used with this combination to give the high R. P. M.

Pepping Up the Ford V8

The new Ford V8 has been on the floors but one year, but in that time every conceivable test has been given it. The hardest of these tests is dirt track racing. Owing to the time it takes to build up the R.P.M. it is necessary to run these V8 Fords in second gear throughout the entire race.

The V8 Ford is built more like a racing chassis than any other car. It already has the dropped front axle, and the rear spring is underslung. About all that is necessary to make it a real racing chassis is to add heavier shocks.

We now commence to rebuild this engine for real speed and power. The new V8 Ford already has good ignition (Mallory). All that is required is to put on higher compression heads made from aluminum alloy, a new top plate that carries two 1½" Downdraft Winfield carburetors with velocity pipes and lighten the flywheel and put in a special low gear ratio, 5½ to one.

V8 Easy to Handle at High Speeds

This new ratio will enable one to use high gear in these dirt track races. As for lubrication this engine has a full pressure oiling system which also makes it specially adapted for racing. The standard V8 Ford wheels are used with the 5.25 rear and the 4.50 in front. This makes the car easier to handle at high speeds. The special high speed equipment as shown carries a 7 to 1 compression.

On the four cylinder Plymouth we use a special cam shaft with flat tappets. Also, special 30 degree seat valves and higher compression on the cylinder heads; two Downdraft Winfield carburetors with special intake manifold with balance pipe; Lynite flywheel. These same changes are made on the De Soto as well.

We must remember, however, that even though all this special equipment is placed on the stock cars for racing, they will not give the speed and power unless special fuel dope is used to hold down detonation.

For the first time we are giving a comparative fuel chart taken from actual engine test given by one of the largest refineries. For every gallon of gasoline we add the following fuel dope:

1.00 Cubic Centimeter	Ethyl Fluid
3.85 Cubic Centimeter	"Day's Ink"
46.3 Cubic Centimeter	Ethyl Iodine
56.7 Cubic Centimeter	Aniline
348.7 Cubic Centimeter	Ethyl Alcohol
572.2 Cubic Centimeter	Xylene
645.9 Cubic Centimeter	Benzine (Benzol)

There are about seventeen drops in one cubic centimeter and we add this fuel dope to the regular gasoline and not high test as the high test will burn up the valves.

Modified stock car racing is getting to be universal in all parts of the world. Right now they are getting ready for the Grand Prix Race in Stockholm, Sweden

Thank You for Mentioning Modern Mechanics and Inventions for December When Writing to Advertisers

Musical Stunts Make Fun and Profits

(Continued from page 105)

The mouth held open helps to intensify the sound of the tone. "The Bear Went Over the Mountain" is probably the easiest tune to play on the head and the beginner should use this piece to practice on.

A "human pipe organ" may be obtained by securing a number of bottles, with a person to manipulate each bottle, as depicted in an accompanying photo. The bottles are played by placing the lower lip against the top-edge of the open end of a bottle. Then move the lower jaw slowly up and down with the muscles of the neck, at the same time expelling air until a point is discovered which causes the bottle to sound.

The materials needed are six two-quart and four one-quart grape-juice or beer bottles.

Tuning the "Human Pipe Organ"

Plenty of water will be needed for tuning the bottles. First blow the tone of one of the empty two-quart bottles and place it at the left-hand end of the "musical instrument." Then whistle or hum the reveille bugle call, beginning with the tone of the empty two-quart bottle. Pour water into another two-quart bottle until the tone is the same as the second tone of the bugle call. Pour water into a third two-quart bottle until its tone is the same as third tone of the bugle call.

Now pour water into one of the one-quart bottles until its tone is the same as the highest tone of the bugle call. This tone should be one octave above the tone of the first empty two-quart bottle. You now have constructed Do, Fa, La, Do of the vocal scale.

To complete the tuning process, pour a little water into another two-quart bottle. Begin with Fa, the tone of the two-quart bottle which you tuned second, and hum the first three tones of "My Country 'Tis of Thee." Tune the bottle to the same tone as the third tone of the song. Call it Sol. Sing Do, Re, Mi, Fa, Sol. Pour water into a two-quart bottle until the tone is the same as Mi, and then regulate the water in another bottle of the same size until its tone is the same as Re.

Quantity of Water Determines Notes

Begin with the tone of the bottle corresponding to Mi and sing the first six tones of "Annie Laurie." The sixth is Ti. Pour water into a one-quart bottle until its tone is the same as the Ti which you sang. Continue to tune the remaining two one-quart bottles to correspond to the Re and Mi which are one octave higher than the Re and Mi of the two-quart bottles. The ten bottles when properly tuned and in order should represent the vocal scale, Do, Re, Mi, Fa, Sol, La, Ti, Do, Re, Mi.

As many people cannot read the note symbolism of music, Dr. Weidemann has devised a very simple system of "number music" to indicate the different tones to be played. To use this system, arrange the musical bottles as illustrated

(Continued on page 122)

Send for Modern Mechanix and Inventions' FREE Blueprint Book.

NOW FIX ANY MAKE OF AUTO

SIX BIG AUTO BOOKS ALL SHIPPED FREE

on approval; whether you want to qualify as garage owner, auto repair expert or merely wish to know how to keep your own car 100% efficient, look at these books—they are sent to you for free examination. This brand new edition has been prepared by a large group of America's greatest automotive engineers. Anybody who can read will understand them, for this great automobile encyclopedia is a veritable gold mine of valuable facts. Take advantage of this offer now! Send in the Coupon for FREE examination. You don't pay us a penny, you don't obligate yourself to pay anything unless you decide to keep the books. Just tell us you want to see them and the full set of 6 great volumes, just off the press, will be sent to you! Read them, look them over and prove to your own satisfaction that one fact alone, which you will find in them, may save you an expensive repair, or help you to a better job.

Aviation Motors
Free Wheeling
Synchro-Mesh
Outboard Motors
Motorcycles
Tractors
All Fully Covered

Very Latest Edition

Imagine books which are so new that every page is right up to date—wiring diagrams, construction details, service problems—are all right up to the minute. Nowhere else can you get as complete and up-to-date information. Over a million dollars of resources have enabled us to give you the most authoritative books on the subject ever published. Everybody interested in automobiles in any way will welcome these books published by the world's largest publishers of Technical Cyclopedias (est. 1897) with agencies all over the world.

Can You Fix It?

Can you take out "play" in differential? Can you kill the "shimmy" in steering? Can you reset TIMING? Can you put your finger on engine trouble without guessing or tinkering? Can you pull in starter off and fix it? Can you adjust and repair transmission, engine, rear axle, bearings?

These Books Tell How

and tell you how to do any and every auto job right, the first time.

6 Big Volumes

Nearly 2,000 pages, over 2,000 illustrations, wiring diagrams, equipment charts, etc. De Luxe edition 6½ x 9¼, gold-stamped flexible binding. Sent FREE for 10 days' use. If not wanted return express collect. If kept, send only $2.00 after 10 days, then $3.00 a month until special advertising price, $24.80, is paid.

A Year's Consulting Membership FREE!

Privilege of consulting engineers of million-dollar American Technical Society on any automotive problem for one year without charge. If you mail coupon immediately.

SEND NO MONEY

American Technical Society, Dept. A-9320
Drexel Ave. at 58th St.,
Chicago, Illinois.

I would like to see the brand new 6-volume edition of your automobile books but without any obligation to buy. I will pay the few cents delivery charges only and will examine the books and return them at your expense in 10 days unless I like them, in which case I will send you $2.00 then and only $3.00 per month until the special price of only $24.80 is paid. You are to include free, consulting membership certificate in the American Technical Society. Send latest edition.

Name

Street

City State

Employer's Name

Employer's Address

This coupon must be filled out in full. If not employed write us a letter explaining your work

FREE! Send Coupon for New BIG TRAIN BOOK

American Flyer leads in size, speed, fun-features and real design. Catalog shows new steam type locomotives with *patented ringing bell* and *lighted fire-box*—also fun making automatic signals, stations, tunnels, bridges, etc. This is the year to get your American Flyer—Never again will prices be so low or values so great. American Flyer Trains were the sensation at the "Century of Progress". Dads, too, make railroading a hobby.

American Flyer Mfg. Co. SEND FREE
2252 S. Halsted St., Chicago, Ill. TRAIN BOOK

Name.....

Address.....

American Flyer Trains

Build Your Own Electric Grandfather's Clock

Most Accurate and Finest Observatory Type

Clock can be easily and quickly assembled—no special tools necessary. Such a Grandfather model as illustrated has never been offered at less than $75.00. But by assembling it yourself, the cost is considerably less. Any boy or man can do it without special training or knowledge. Stands over 6½ feet high.

A Magnificent and Massive Grandfather's Clock of Purest Colonial Design, Appearance and Finish

Completely machine-finished Grandfather's Clock case parts, mortised and doweled ready for assembly, in genuine mahogany, walnut, butt matched quartered oak, including hardware **$30.00**

Hartford Universal Electric Observatory Type Master Movement, including silver dial and antique pierced hands of exquisite design; runs direct from Central Station current or for long months from a 25c dry cell..... **$40.00**

(Prices for cheaper movements on application)

Set of 6 Prints, with detailed instructions for assembling a Grandfather's Clock case. Cost postpaid for **$1.00**

(Deductible on final payment for parts.)

Send $1.00 TODAY for Prints and FREE Descriptive Circulars.

HARTFORD CLOCK CO., 200 Central Ave. Jersey City, N. J.

Musical Stunts Make Fun and Profits

(Continued from page 121)

in an accompanying drawing. Here's how you'd play "The Last Rose of Summer".

Verse: 1-2-3-8-7-6-5-5-3
1-2-3-5-3-2-1-1
1-2-3-8-7-6-5-5-3
1-2-3-5-3-2-1-1
5-3-8-7-6-5-5-3
5-3-8-7-6-5-6-7-8
1-2-3-8-7-6-5-5-3
1-2-3-5-3-2-1-1

The number music for "Annie Laurie":
3-2-1-1-8-7-7-6-6-5-3-3-2-1-2
3-2-1-1-8-7-7-6-6-5-3-2-1-1
5-8-8-9-9-10
5-8-8-9-9-10
10-9-8-7-6-8-6-5-3
3-2-1-8-3-2-1-1

Number music for other simple tunes such as "Old Black Joe" and "Silent Night" can be figured out by the player.

Playing on musical glasses is a trick closely related to the "human pipe organ." Either table or jelly glasses more or less filled with water to form the musical scale are needed for the musical glasses. The rims of the glasses are tapped with prepared mallets to produce the tones, but if very thin large glass tumblers are used, the sounds can be produced by putting resin on the finger tips and rubbing the rims of the glasses gently with the finger-tips to produce unusually clear and beautiful tones. Tuning is done in the manner of the "human pipe organ."

Cash Prizes for Shotgun Problem

(Continued from page 66)

strument and enclosed the whole works in a glass case, from which the air is pumped to leave a vacuum.

With an electrical firing mechanism we will shoot both the barrels, noting the hand on the recoil indicator.

The problem is this: Will the recoil or kick of each barrel be the same as when fired in the atmosphere? (Remember that the loaded shell registered ten units, the blank shell one unit.)

For the best solution to this problem Modern Mechanix and Inventions will pay $25 as follows: First prize $10, second prize $5, four third prizes of $2.50 each.

You're not expected to go into intricate ballistic formulae—just state in a simple, concise, straightforward manner why the kick will remain the same—or different. Or maybe there would be no kick at all. Hold your letter down to 250 words or less. It should be postmarked not later than November 1st, 1933.

Decision of the judges, who will be Modern Mechanics and Inventions editors, will be final. In case of ties, duplicate prizes will be awarded. Employees of this magazine or any member of their families, of course, are not eligible to compete. You don't have to be a subscriber to the magazine to enter your letter—you don't even have to buy a copy. Just send in your letter and it will be given careful consideration as a possible prize winner. Address M-M Puzzle Editors, 529 So. 7th St., Minneapolis, Minnesota.

Thank You for Mentioning Modern Mechanics and Inventions for December When Writing to Advertisers

"Wanderer"—a Two-wheel Trailer

(Continued from page 99)

Then set up in the lathe and take a light cut from the outer face of each plate. This operation will give perfect alignment of the spindles.

The spindles are Chevrolet '29 to '32. All work necessary on spindles is to ream out bolt holes to ½ inch and saw off the boss from upper side so spindle can fit flat against axle end plate. Braze Chevrolet rear spring saddle to axle as they are malleable castings.

Assemble wheels "Chevrolet '29 to '33" and springs "Chevrolet '29 to '33" eight-leaf rear.

Use old style or "'29" spring shackles and bolts. After assembling the chassis block up all four corners and level the frame carefully, for you will find this a great help later on.

Constructing the Body

You are now ready for the body. (See Fig. 3.) Have your mill supply straight grained white oak post and side rails in net sizes. They are all of one and one-fourth by two inch stock. Cut 18 posts 57¾ inches long, one post to go under rear window 31¼ inches. Cut four side rails 9 feet, 11½ inches long. Also have mill cut 8 oak 1¼ x 2 inch corners. Use your 12 inch radius template to lay out.

Cut four end rails 47 inches long. On two sides two end rails and four corner pieces have the mill babbitt upper outside edge 3/16 inch deep and 1 inch wide as shown in detail "B."

Mortise post and rails as shown in detail B, but do not fit the mortise too tight as it will have a tendency to spring the post and rail out of alignment.

Assemble post and side rails, glue all joints and check for squareness and alignment before glue sets. Bolt post to frame with 5/16 inch flathead stove bolts. Countersink the bolt head in the frame rail.

Now square up and align end and side assemblies and firmly brace in place.

How to Fit Corner Pieces

You are now ready to fit corner pieces. I find an easy way to do this is to use a carpenter square, fitting the square between the posts, marking on it their position. Then lay the square on top of corner piece.

You can mark and cut for an exact fit. To fasten corners in place use 2 by ⅛ inch steel plate 6 inches long screwed to each end. To brace ends and corners and form bottom of upper cabinets, cut from ¼ inch plywood two pieces 12 inches wide and 66⅝ inches long. Cut ends to fit corner curve, then glue and screw to top of upper end and corner rails.

The floor is ½ inch plywood. Lay and bolt it down with 3/16 flathead stove bolts as shown in Fig. 1.

Now for the top bows. Cut the lower ends of bows to fit rabbet in side rail and bolt as shown in detail (B). Before bolting up bows lay a straight edge or line along center and along each side from bow 2 to 8, then adjust all bows to this level to get a smooth, level top.

For top slats have mill supply 14 ft. x 3/16 inch by 1⅜ inch straight-grained rip cypress.

(Continued on page 124)

Help Your Kidneys

WIN BACK YOUR PEP

Good Kidney Action Purifies Your Blood—Often Removes the Real Cause of Getting Up Nights, Neuralgia and Rheumatic Pain—Quiets Jumpy Nerves and Makes You Feel 10 Years Younger.

A famous scientist and Kidney Specialist recently said: "60 per cent of men and women past 35, and many far younger, suffer from poorly functioning Kidneys, and this is often the real cause of feeling tired, run-down, nervous, getting up nights, Rheumatic pains and other troubles."

If poor Kidney and Bladder functions cause you to suffer from any symptoms such as Loss of Vitality, Getting Up Nights, Backache, Leg Pains, Nervousness, Lumbago, Stiffness, Neuralgia or Rheumatic Pains, Dizziness, Dark Circles Under Eyes, Headaches, Frequent Colds, Burning, Smarting or Itching Acidity, you can't afford to waste a minute. You should start testing the Doctor's Prescription called Cystex (pronounced Siss-tex) at once.

Cystex is probably the most reliable and unfailingly successful prescription for poor Kidney and Bladder functions. It starts work in 15 minutes, but does not contain any dopes, narcotics or habit-forming drugs. It is a gentle aid to the Kidneys in their work of cleaning out acids and poisonous waste matter, and soothes and tones raw, sore, irritated bladder and urinary membranes.

Because of its amazing and almost world-wide success the Doctor's prescription known as Cystex (pronounced Siss-tex) is offered to sufferers from poor Kidney and Bladder functions under a fair-play guarantee to fix you up to your complete satisfaction or money back on return of empty package. It's only 3c a dose. So ask your druggist for Cystex today and see for yourself how much younger, stronger and better you can feel by simply cleaning out your kidneys. Cystex must do the work or cost nothing.

High School Course in 2 Years

This simplified complete High School course—specially prepared for home study by leading professors—meets all requirements for entrance to college, business and leading professions.

College Training

Over 200 noted Engineers, Business Men, and Educators helped prepare the special instruction which offers you college-grade vocational training at home.

U. S. Government figures show that the high school graduate averages $16 a week more than the grade school graduate, while the college man averages $25 a week more than the high school graduate and $41 a week more than the grade school graduate.

The University of the Home

No matter what your inclinations may be, you can't hope to succeed without proper training. Check kind of work preferred and let us send you full details without obligation.

American School

Dept. G-922, Drexel Ave. at 58th St., Chicago

- Architecture & Building
- Automotive Engineering
- Business Management
- Higher Accounting (C.P.A.)
- Drafting & Design
- Electrical Engineering
- Civil Engineering
- Complete Law
- Mechanical Engineering
- High School Course

Name ..... Age

Address .....

When

Doors Won't Open
Faucets Drip
Windows Stick—

Fix Them Yourself

The "Handy Man's Home Manual" SHOWS YOU HOW

Now on Sale at All Newsstands

PRICE 50c

If your news dealer is sold out, send 50 cents to Fawcett Publications, Inc., 529 South Seventh Street, Minneapolis, Minn., and a copy of the Handy Man's Home Manual will be sent to you at once.

"Wanderer"—a Two-wheel Trailer

(Continued from page 123)

Soak ends of slats in water for a few minutes and they will bend readily. Bolt center slat first and work each side down together.

Side panels are 24 gauge auto body metal. Nail only upper edge and ends. Lower edge is held in place by 3/16x⅝ steel moulding bolted through side panel and rail as in detail B. Allow ½ inch from top of side panel to top of middle side rail for upper side cover nailing space.

At this stage I prefer to build inside trim and cabinets. For the upper end cabinets we already have the bottoms in, so we frame up with ¾x-1¾ inch stock and panel with ¼ inch plywood. Make door from ¼ inch plywood and swing from top.

Front lower cabinet includes refrigerator, sink, table, stove and two storage cupboards. Build in as in Fig. 3. Use ½ inch plywood for top, cut ends to fit body corners, glue and screw to top of middle end and corner rails. Ice box is insulated with two layers of celotex on sides and top, bottom four layers. Use 26 gauge galvanized iron for box lining.

Trailer Has Built-in Wardrobe

Build in wardrobe and right wheel housing as in plates 1, 2, 3, 4. The top of the wheel housing makes the dressing table. Left housing is made from a '25 or '26 Chevrolet rear fender cut off and bolted between lower side rail arch bar and side panel. Use half circle of body metal left when you cut out wheel clearance from side panel to side up inside of left wheel housing.

The next step is the painting. I painted all inside a dark green except door panels which were stained and varnished. Paint outside lower panels to match tow car.

After painting comes the top and side covers. You will find it makes a much better job to first cover top and upper sides with tan awning material, and then stretch auto top material over that.

When cutting be sure grain in material runs lengthwise with the car. I would advise having an auto top man cut and fit the top, as an ordinary sewing machine will hardly handle the job.

Top Covered By Auto Material

For the top use two pieces of 54 inch double texture auto top material, stretched over top of trailer with seam in center. Fold under ¾ inch and lap over the other side to make center seam and temporarily tack in place, but leave both ends loose for about 30 inches. Pull down and temporarily tack sides.

Now pull in end centers, lap over and temporarily tack. Cut corners as in the drawing. Pull out most of the wrinkles, lap over and tack.

Chalk mark all seams, allowing ¾ inch for turn-under. Pull tacks, remove cover, and sew with heavy waxed thread. Then put cover back on top.

Starting with a tack in center of each end, pulling out all wrinkles as you go, next tack center of each corner and so on. It may be necessary to dampen the under side of material at corners. It also makes a smoother job to pad corners and end.

"Wanderer"—a Two-wheel Trailer

Use ¾ inch aluminum runningboard moulding to bind sides of windows and doors. To bind bottom edge of upper side panel, use ⅜ aluminum crown moulding. For edge of top and side panel use aluminum drip moulding. The top material and mouldings can be purchased from any auto trimmers supply company or from your Chevrolet dealer.

Next job is to hang windows and doors. Swing the windows from the top. Hang the door with hinges to the front. Go to a junk yard and buy a lock and control board assembly from a right front door of a '25 or '26 Chevrolet closed body. Cut off and install complete on your door.

For water supply use a galvanized tank 10 inches in diameter and 24 inches high, installed in left front corner under sink, with a radiator filler cap on outside of body. The discharge pipe comes in at the bottom of tank, and a tire pump is valved in at top of the tank.

Fill tank ⅔ full of water, give pump a few strokes and there you are.

Installing the Bunks

For the bunks I use a standard ¾ bed spring. Weld on short angle legs and bolt to floor. For upper berth use single or double canvas cot hooked to brackets screwed to side posts over lower berth. To support outer edge use two folding legs to rest on floor. When not in use you can swing whole assembly up and hook to roof bows.

Use a four-wire, rubber-covered cable from trailer to plug-in on car. Install storage battery (6v) in trailer, ground the negative terminal to the frame and to ground wire in cable. Then connect positive wire in cable which continues to battery side of generator.

Use Chevrolet '31 or '32 stop and tail lights, bolting one on each side of lower back panel. As lights and panel are grounded through frame and cable to car, all we have to do is continue tail and stop light wires from the car through the cable and then to their respective terminals on trailer lights.

Install an auto dome light on the forward side of the wardrobe, and another in bottom of forward upper cabinet directly over icebox.

This trailer gives the constructor an unlimited opportunity for making those little fittings and cabinets and gadgets that so delight the builder.

Daring Death With Cameraman

(Continued from page 135)

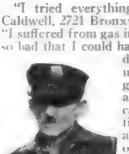
he cannot pause to inquire as to the weather. He can not wait until ideal conditions prevail. He must go or the scene he is after will no longer exist and a rival will beat him to it.

Lieut. Eddie Dowling of my staff was covering army maneuvers from the air not long ago when the plane he was riding dove into New York Bay. A parachute jump was out of the question because the plane was too close to the water. A fireboat picked him and the pilot up, and, after a brief spell of recuperation, he was back in action again—all set for new adventures.

The news cameraman of the newspapers and the movies is the friend of the high and low. That's all in a cameraman's life.

Stomach Disorders Threaten His Life Says N. Y. Patrolman

"I tried everything," says Officer David R. Caldwell, 2721 Bronxwood Ave., New York City. "I suffered from gas in the stomach and heartburn so bad that I could hardly stand it. My case was diagnosed by one doctor as ulcers, another said I had gall stones. One went so far as to tell my wife that I had cancer and had only a short time to live. I suffered much agony and lost weight until one day I saw an advertisement in the New York Daily News, by the Udga Co., St. Paul, Minn. I wrote for their treatment and thanks be to God I did, for today I am a different man. I have no pain, can eat anything and I am getting back to my normal weight."



DAVID R. CALDWELL

Acid Stomach Afflicts Millions

Hyperacidity (acid stomach), is, as every physician can tell you, the curse of millions. It is the most common cause of stomach or gastric ulcers as well as many other distressing conditions and there are comparatively few adults who can truly say it has never troubled them. In addition to stomach ulcers, acid stomach is often the direct cause of gas pains, dyspepsia, poor digestion, pains after eating, bloating, belching, gnawing pains, heartburn, gastritis, sour stomach, constipation, etc.

Double Acting Treatment Needed

To combat these conditions you need a treatment that will first counteract or neutralize the excess acid secretions and then protect, soothe and tone the membranes or stomach lining in order that the process of healing may take place. This is the function of the Udga Treatment and the excellent results it has produced in so many thousands of cases are due to this double acting feature.

Offered on 15 Days' Trial

And now that the merits of this splendid treatment have been so conclusively proved, the distributors invite all sufferers to try it at their risk and are willing to send a full 15 DAY TREATMENT ON TRIAL. So if you can believe what your own stomach tells you—if you agree that freedom from stomach pains, distress and misery are the surest proof of results, accept this liberal trial offer and see for yourself what the Udga Treatment can do for your sick stomach.

Clip and Mail Now

UDGA, Inc., 600 Foot-Schulze Bldg., St. Paul, Minnesota.

Please send me your 15-DAY TRIAL OFFER on the Udga Treatment. Also free copy of your book on stomach troubles, testimonials, affidavit of genuineness and $1,000.00 Reward Offer to back it up. This does not obligate me in any way.

Name .....

No. and Street .....

City ..... State .....

BATWING

ICE-BOAT SENSATION

NEW — BUILT in 3 DAYS at Amazing Low Cost!

The BATWING III

Don't waste time on hard-to-build, obsolete or un-proven ice-boats! BATWING III is a tested, PROVEN ICE-YACHT! Has new "quick-assembly" method—latest "front-steering NON-SPIN design —easy riding. Take her down in a jiffy and put her up the same! You don't need to live ON a lake —land sailing thrilling, too! Think of that. Costs little yet outsails and out-classes "home-made crates" twice its size!

YOU can build this new, sensational front-steering Head Ice Yacht in 3 days at home from complete knock-down Kit at low cost! No experience needed. The Batwing III speeds 75 m.p.h.—carries 90 feet of sail—seats 2 comfortably—and can be dismantled for auto travel in one minute, re-assembled in 5! Safe in heavy winds yet sensitive to lightest breeze. HOT—what a genuine thrill you're going to get sailing Batwing III!

PORTABLE!

WRITE TODAY!

Be first in your locality to sail this WONDER ICE-YACHT! Don't wait another minute. FIRST get all the facts—send 10c today for descriptive CIRCULAR. Remember, advancing prices may soon raise the LOW cost of BATWING III—so you will be wise in acting at once!

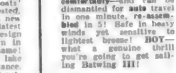


Photo shows BATWING III dismantled for travel.

MEAD GLIDERS

12 South Market Street — Dept. 12-M, Chicago

MANUFACTURERS OF FAMOUS MEAD "KI-YAK"

WORLD'S FINEST PHOTO-INSTRUMENT

3 CAMERAS IN ONE!

In all the WORLD No Other CAMERA Like This!

Used by U.S.Gov't.

The only Automatic Winding, Ground Glass Focusing using Standard Roll Film. Takes 3A, or 3½, or 4½ Post Cards—2 to 10 Pictures on a 6 exposure film. No Double Exposures with "PAL KO"—it thinks and counts for you! Best Optical Lenses obtainable and Satisfactory Performance Guaranteed or Money Refunded! Sold Direct "From Manufacturer to You."

Member N. R. A.

Free Catalog Mailed on Request.

PAL KO, Inc., 823 W. Washington Blvd., Dept. L-1 CHICAGO, ILL.

LEARN ADVERTISING ART

BE A COMMERCIAL ARTIST

Learn quickly! Photo-retouching; fashion; advertising layout; commercial, automotive and merchandise illustration and label designing; layout and design for booklets, folders and direct mail advertising. Get our Free Booklet and Facts.

SEND FOR FREE BOOK OF FACTS

ACADEMY OF ADVERTISING ART
Founded 1902
2813 W. Grand Blvd., Detroit, Mich.

12 and 15 in. Flying SCALE MODELS

Your Choice of 10 Different Models

Any 2 for 60c POSTPAID

Full fuselage Models guaranteed to fly. Each complete in Construction Kit with all parts, materials and Plans—Instructions.

Monocoupe — Spurrow Hawk — Puss Moth
Polish Fighter — Fokker D-8 — Fokker Triplane
Boeing Fighter — Sopwith Camel
Heath Parasol — British B. E. 5

Send 4c for New Christmas Catalog of Newest Kits

IDEAL AEROPLANE & SUPPLY COMPANY, Inc.
20 - 28 West 19th Street — New York, N. Y.

$5 Builds Light Weight Boat Trailer

(Continued from page 107)

out reinforcing this point, it is undoubtedly the weakest part of the trailer; and if a heavy boat is to be hauled, it should be strengthened by iron strips, top and bottom, bolted on. Quarter inch holes through the housing will not weaken it.

In order to allow for the play of the spring, it will be noted that a truck bearing has been used for a collar over the housing to support the front end of the frame work. This must be fitted on before the coupler is attached, of course.

Iron strips about a foot in length are welded on, top and bottom, after bolt holes have been drilled in each end of the strips. Assuming they have been cleaned of rust and painted with a good metal paint, the running gears are now ready for the wooden frame work.

Constructing the Frame

First, ten foot 2x4's are bolted down, front and rear, V-shape, as the foundation. Naturally, they should be seasoned, straight grained lumber, free of knots. Allowance may be made for bowing in toward the front, if desired.

The cross pieces, cut to fit the boat bottom, should be spaced on the trailer to fit the boat, with a mind toward the equalization of weight. It happens my boat is a canvas covered V-bottom hydroplane, hence the cross pieces are accurately formed from patterns to fit the boat perfectly. All that is necessary is to have a mark on the side of the boat, to match in line with up-right rods. This will insure the boat being adjusted properly on the trailer.

The cross pieces are bolted down, through the 2x4's, the bolt heads sunken. Then, if the boat is a fine cedar one, or has an iron or canvas bottom, the pieces should be padded to minimize damage by friction. I used felt padding and covered it with strips of inner tubes, tacked down with roofing nails.

Dimensions Adjustable to Fit Boat

The center piece was constructed from 4x6 and 4x4 pieces. One 4x4 was bolted down; then to fit the boat, two pieces, 4x23 in. long, tapering from three inches thick at one end, to one inch at the other, were sawed out and nailed to the 4x4, thick ends to the outside. The front cross piece is 42 inches, the center 46 and the rear 43 inches in length. Of course, the bed may be wider to fit wider boats.

The upright ½ inch iron rods, adjusted for the height of the boat, are attached to the center cross piece with iron lag screws, through eyes, so the rods may be turned down to facilitate loading of the boat onto the trailer. I am using a wooden cross piece, 1x3½ inches, for holding the boat down, but it has a tendency to bow up in the center when the butterfly nuts are tightened down. An iron strip would be preferable, and less unwieldy than a 4x4, neither of which would bow up.

It is only a moment's job for two men to lift a boat onto this trailer, and strap it down with the cross piece. There are no standards to lift it over, so that two men can readily lift any ordinary portable boat onto the trailer bed, which is only a few inches above the wheels. A trailer so designed that the boat must be loaded in from rear end is much less convenient.

$5 Builds Light Weight Boat Trailer

There is no pin in the Corwin coupler I am using, so that the trailer may be readily unhitched, without tools, for quick turning around on a narrow road.

I have frequently transported my cruiser-type hunting boat, weighing 125 pounds, on top of my sedan. This weight is not too much for a sedan. However, in view of the fact most tops of late models are convex, whereas gunwales are straight, a wooden cradle will facilitate matters.

To make a cradle, take two six foot lengths of 2x4's, and from a pattern mark off the contour of the car top, front and rear, and cut out the wood to fit, using hand saw, chisel, drawing knife and rasp.

Securing Boat to Trailer

Pad the formed edges, then cut the ends off to fit car top, so they may be tied with 1x3 inch strips, lengthwise of the car. The boat should now rest on the 2x4's, without touching the car top, which is easily damaged by friction. A means may be worked out for having the cradle anchored securely to the car, with a quick means of fastening the boat to the cradle. Ropes may be used to strap both down securely.

Besides providing a level plane for the boat, a cradle, being already padded and fitted to the car top, saves your time in loading. Two men could have a boat and cradle strapped down, ready for travel in five minutes. This form of transportation is especially suited for medium light-weight craft, under one hundred pounds.

Light From Windmill Generator

(Continued from page 100)

is screwed to the top disc. A maple pulley, also, turned on a lathe, is screwed to the top disc of each rotor.

The lower edges of the vanes also fit into slots in wooden discs. These discs also act as synchronizing gears. A deep groove is cut in one disc, and, at equi-distant intervals, ¼" steel pins are pressed through the wood. The other gear is made by driving staples into its face to correspond with the openings between the pins.

The generator can be bought at an automobile wrecking plant. The drive gear, or sprocket, is removed from the shaft and replaced with a double-groove pulley for the two belts from the rotors. Since the generator is protected from the elements, it requires only an occasional oiling.

A six-volt battery and an automatic cutout completes the assembly. Often automobile generators are equipped with cutouts.

If this wind motor is built with reasonable care, it will generate sufficient power for a nominal electric lighting system.

TELESCOPE MAKERS SUPPLIES

Complete line of Reflector Making Kits and Parts for the Beginner or Amateur. Highest Quality Glass Mirror and Tool Discs, Prisms, Eyepieces, Polishing Rouge, Abrasives, Pitch, Etc. We have the 4, 6, 8 and 10-inch sizes. Write for Free Price List

AMERICAN TELESCOPE CO.
4008 Addison St. Chicago, Ill.

HUNDREDS Have ALREADY Won Big Cash Rewards

Would YOU, TOO, Like to

WIN $2,500

or Buick Sedan and +1,000

I WON $5000.00

This is our sensational new way to advertise — giving away 100 cash prizes totaling over $5,000.00 — besides thousands in EXTRA cash rewards. **Not a cent of your money needed now or ever** to win $2,500.00.

Can YOU Find 4 Dogs in Picture Above?

I WON $4740.00

Tell me quick! Some are upside down. **Hundreds have won** big cash rewards in other campaigns conducted by men in this firm. Here are a few: Anna Jamison, Pa.— $5,000.00, Dennis Beemer, Mich., $4,740.00, Mrs. Kate Needham, Ore.— $4,705.00, I. Nystrom, Ore.—$3,700.00, Helen Shick, Pa.— $2,565.00. Now comes **your** chance. You are GUARANTEED to win a cash reward if you take an active part. Not a lottery. No luck needed. Hurry—get started quick by finding 4 dogs. In addition to giving quick I will pay

I WON $4705.00

$1,000.00 EXTRA for Promptness

I WON $3700.00

to First Prize winner. Not only **one** person, but **hundreds** will be rewarded. In case of ties, duplicate prizes will be given. All the money to pay prizes is in the Bankers Trust Co. at Des Moines. I invite you to look us up through any bank in Des Moines, any credit agency, business house, magazine, newspaper.

WRITE QUICK

I WON $2565.00

Send no money. Mark dogs found, clip picture, mail quick, or write on penny post-card, how many dogs you find. For replying I will tell you how you **may also** win big EXTRA cash rewards and $2,500.00 too. Answer NOW! Tell me which you want to win—$2,500 or Buick and $1,000.

Merrold Johnson, Prize Mgr.
Dept. 338, Des Moines, Iowa

$10,000.00 REWARD will be paid to any worthy charity if anyone can prove that we do not really give away all these thousands of dollars in cash prizes—or that all this prize money is not on deposit in the bank.

Put Professional SNAP into your

DANCING Why be stiff, awkward, amateurish, when it is easy to learn to dance correctly, beautifully, technically, by this remarkable new scientific method—The Dancegraph—in 10 easy lessons! Send only $1.98 for complete course. 5 day trial. Money back if not satisfied.

FREE with order—Fascinating Booklet, "Capture the Living Glamour of Your Own Personality." Mark X for course desired

☐ Ballroom ☐ Tango ☐ Tap and Clog

DANCEOGRAPH DANCE ART, Inc.
555 Sutter St. San Francisco, Calif.

Train for Good Jobs

Learn Autos
IN LOS ANGELES

Jobs are again becoming available—but the trained men are getting them. Enroll at National and quickly learn AUTO REPAIR and servicing. You can qualify for general repair expert, ignition expert, battery specialist, engine overhauling and all other profitable branches. Diesel Engine Course being added. Enroll before present low tuition fee is advanced. Complete Practical Auto Instruction. You learn by actual shop practice method in largest trade school in West. Est. 28 yrs. ago. 20,000 graduates.

BOOK AND BOARD WHILE LEARNING
If you are short of money, enroll anyway. Low cost of room and board are among room and board. We'll help you secure part time job. Classes start here selected in Los Angeles.

SEND FOR NEW BOOK OF DETAILS
Profusely illustrated Book, telling all about course, new equipment, Los Angeles scenes and picture story of auto training FREE. Send coupon

Back to Prosperity
1934
is the year for you to earn money
National trains you for the Big Opportunities

NATIONAL
AUTOMOTIVE SCHOOL
Los Angeles

Name
Address
City State

Agents Wanted to Sell
FLEXIBLE STEEL RULERS

Here's a selling sensation! A great money maker! It sells on sight! Everybody buys! Get this while it's HOT!
29½" long, Steel Case, $1.20 dozen!
78" long, Steel Case, $1.85 dozen!
78" long, Bakelite Case, Automatic Nickel push button, $2.40 dozen!
Name in Pull and Push Bakelite Case, $2.75 dozen!
Order at least one dozen at once —or—RUSH $1.00 and we will send you 4 samples—one of each described above—Hurry!!
EMPIRE MERCHANDISE CORP.
Dept. 102
246 Fifth Ave. New York, N. Y.

BE A RAILWAY
TRAFFIC INSPECTOR

Good Opportunities in an Uncrowded Field
ACTIVE MEN 18 to 50—wanted for Railway and Bus Passenger Traffic Inspection. Healthful, interesting work; travel or remain home. Complete spare-time course quickly trains you to qualify. Many make $110 to $200 monthly expenses and up to $3,000 a year. Write today for Free Booklet, STANDARD BUSINESS TRAINING INSTITUTE, Div. B113, Buffalo, N. Y.

BUILD THIS BOEING 247

Nearly 5 foot span; Weight 16 oz.
Highly detailed replica of the U.S. Army Cleveland Navigated model of the big 10 passenger Boeing now flying America's air lines. This is actual photo of the "U.D." model itself. Colored silver entirely. Complete KIT 75 with everything needed, at your dealers, or express shipping charges collect (weight not over 10 lbs.) $5.00.
Hailed as a masterpiece in Model Flying Aircraft.
Send 3c stamp for illustrated list No. 12
CLEVELAND MODEL & SUPPLY CO.
1964-LM West 97th St., Cleveland, O. U.S.A.

Hunting Down Animal Outlaws

(Continued from page 117)

cattle, found the wolf's trail and followed him all day on a fresh track.

This led up to the mouth of a canyon, and knowing that the wolf would be taking a sleep after his big feed, Williams tied his horse and set forth on foot. Just then two horsemen approached him, riding at breakneck speed, and calling to Williams that they had found a yearling steer killed by the renegade. Williams motioned them to go back, but they evidently didn't understand what he meant, so he was forced to return to meet them.

When finally Williams returned to the trail he found the place where the wolf had bedded down to sleep. The noise made by the horsemen had given him the alarm and he had sneaked down the canyon, very close to the hunter, and escaped.

Early in September Lady Luck smiled on Williams. The wolf showed that he wasn't quite so trap-wise as had been supposed. He stepped into a big trap and was caught slightly by one foot. Apparently the trap had tipped so that it had caught only one side of the foot and the wolf was able to pull loose. He left some hair in the trap. Early in October he had another narrow escape from another trap.

Williams Tells About Hunt

Williams finally got the wolf on October 11. Here is his own account of the catch:

"He stepped into a trap in the morning and it got a good grip on him. He ran with it about 150 yards when the hook caught on a tree. But that did not seem to stop him at all. He broke the swivel of the trap and ran with it on his front foot.

"I trailed him three miles and got a shot at him. This did the trick. But he has been so lucky that I really expected the gun would fail to shoot, but it worked O. K.

"He was smaller than the average male wolf, weighing 98 pounds and measured just six feet from tip to tip; 11 inches from toe to hock; and had a tail 14 inches long. His teeth would have been good for 15 years longer. He broke some of them off on the trap, but aside from that they were in good condition. He was an old wolf with a tail that was almost white."

In this simple fashion does the government sleuth, who outwitted one of the cleverest of animal criminals, tell his story.

Hunting Mountain Lion Great Sport

Probably there are more of the elements of sport in hunting the mountain lion than in trailing most of the other predatory animals, due to the tremendous size of the lion. Near Prescott, Arizona, recently, Hunter Frank Colcord killed one that measured ten feet from tip of nose to tip of tail and was estimated to weigh close to 200 pounds.

Generally speaking the government hunters prefer to track most of the killer lions with dogs and then shoot them, since so many of the animals are trap-wise and poison-wise. A good hunting dog, and he may be bloodhound, Airedale, wire-haired terrier or just plain "hound," is very valuable. It takes two or three years to train one properly.

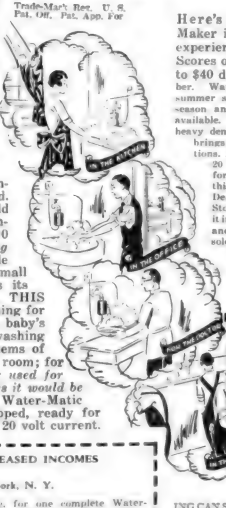
Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

TURNS COLD WATER INTO HOT WATER INSTANTLY!

New IMPROVED Model

Was $3.95 NOW Only $2.75

Trade-Mark Reg. U. S. Pat. Off. Pat. App. For



WATER-MATIC is giving satisfaction to thousands of housewives and business people. It's practically indispensable when once used. Snap Water-Matic on your cold water faucet, plug into a convenient electric outlet, and in 10 seconds you have hot *running water*. No need to heat a whole tankful of water when only a small quantity is wanted. It saves its own cost by lowering fuel bills. THIS MODERN MIRACLE is a blessing for preparing baby's bath, heating baby's bottle, or a hot water bag, washing dishes, lingerie and fragile items of apparel; for shaving; for sick room; for emergencies. *If it were never used for anything except for emergencies it would be well worth its price.* Every Water-Matic comes to you completely equipped, ready for use on either A.C. or D.C. 105-120 volt current.

Here's the biggest Money-Maker in years: Men with no experience average $9.60 daily. Scores of others earn from $30 to $40 daily from May to October. Water-Matic is a sensational summer seller. Fires are out for the season and hot water is not always available. Cash in on the naturally heavy demand. Our simple sales plan brings 7 sales from 10 demonstrations. It's easy. We show you how.

20 MILLION HOMES wired for electricity are waiting for this needed utility. Doctors, Dentists, Druggists, Garages, Stores and business places find it indispensable. Summer Camps and Cottage Colonies can be sold on sight. If you are looking for a big pay job, take this proposition while the season is still young. Make a Year's salary during the next three months.

Get into BIG MONEY

Why half-starve on a part-time job when you can get into the BIG MONEY with WATER-MATIC? *No experience needed.* Once you see how WATER-MATIC works on your own faucet, you become so enthusiastic NOTHING CAN STOP YOU.

We show you every thing — how to demonstrate, how to close sales, collect your CASH. Start in Spare Time—10 Sales, an Evening's Easy Work, Make you $12.00 CASH IN HAND. *Full time earnings averaging 25 Sales a Day $50.00 a Day,* $180.00 *a Week,* $780.00 *a Month, More than* $9,000.00 *a year* Territory is Going Fast. Tomorrow May Be Too Late.

MAIL THE COUPON AT ONCE

WATER-MATIC

TO MEN DESIRING INCREASED INCOMES
MODERN WIZARD MFG. CORP.,
246 Fifth Avenue, Dept. M-12, New York, N. Y.

I enclose $2.75, the wholesale price, for one complete Water-Matic Sales Outfit. I understand that I am to demonstrate Water-Matic and take orders at $3.95 each. I will collect $1.20 as my commission and send the orders to you for delivery direct to my customers C. O. D. for the balance of $2.75.

Name .....

Address .....

City ..... State .....

No C.O.D.'s—Please Send Postal or Express M. O.

150 JIG SAW

Plus Adapters and 12 Assorted Saw Blades. Adapters enable you to use any type blade from coarse to very fine. **NEW FEATURE!** hardened steel grooved roller saw guides formerly found only on more expensive machines. Has rugged 150 lb. trestle or A-frame construction, 33" long, 20" high, 6 1/2" table, most universal range of all 16 outside 11 B. & S. Blades. Make Your Own Jig Saw Puzzles given with every saw. Write for description of E. Lathe, 12 Drill Press, 21 Horizontal Disc Sander, etc.

NEW METAL PRODUCTS CO. 488 St. Paul Street, Rochester, N. Y.

GROW MUSHROOMS

We show you how; use cellar, idle space; plant all seasons; overnight crops. We buy; 540% profit; our service free. Act quick.

INTERSTATE MUSHROOM INDUSTRIES
DE-7357 Cottage Grove Ave., Chicago, Ill.

IT COSTS YOU NOTHING UNLESS IT GROWS YOUR HAIR

Eliminates Dandruff... Stops Itching Scalp

JACK SLAVIN Before Treatment

We refund every cent of your money if you are not more than satisfied. Nothing to lose. "The Bald Spots are Covered with New Hair," writes E. L. among many others. Send NOW for FREE information in plain sealed envelope without any obligation

SLAVIN CO., Dept. A-265
209 Post St. San Francisco, Cal.

JACK SLAVIN After Treatment

"WHAT MAKES IT LIGHT"
Make Big Money Asking This Question
MYSTERY CIGAR LIGHTER Non-Scientific Marvel

Entirely new principle of ignition. It surprises. It amazes. It sells like wildfire. No Flint or Friction. All guaranteed. Sample with Sales Plan 25c. Sample Gold, Silver or Chromium Plated $1. Agents write for a real money making proposition.

NEW METHOD MFG. CO., Desk M-12, Bradford, Pa.

"BUILD YOUR OWN"
TELESCOPE

Same type as 100" Mt. Wilson Telescope. No experience or special tools needed. We furnish complete set of instructions and all necessary materials at lowest prices.

Send for 1933 catalog on Telescopes, Microscopes and Optical Supplies

PRECISION OPTICAL CO., 991 E. 163d St., NEW YORK

Build a Novel Cigarette Holder and enter $150 Prize Workshop Contest.

See page 55.

Toymakers

TOYMAKERS. Complete blueprints of seven popular toys 30c postpaid.

WEE-SHO-U CO.
Lock Box 75-MK Detroit, Mich.

Simple Exercises Develop Muscular Power

FREE STRONG MAN STUNTS

If you are interested in athletics, in greater muscular force, and in strength stunts write David Rush at once, enclosing stamped reply envelope. Put in a picture if you have one handy. Just as soon as your letter is received you'll be sent a chart telling how to do a number of strong man stunts, and also a membership card in our "Be Strong—Can You Do It?" Club. Get your membership card now. Simply send your name and address and a fully stamped envelope for reply. If you live outside the U. S., send 3c in coin. Address your letters to David V. Rush, 407 B.M.A. Bldg., Kansas City, Mo.

Can you tear a pack of cards? Or lift an ordinary kitchen chair by gripping one leg? Or can you make a human bridge and let a man stand on your stomach?

These are all easy if you have the muscles you should have. What is more, if you lack the strength to do any one or all of these stunts there is no excuse for being unable to do them six months from now. Building muscle and learning to do really difficult stunts is not child's play but any man with ambition to make half an effort can accomplish a great deal in a few weeks.

Here for example are two simple exercises that will do you a vast amount of good, not only in building muscle, but in keeping you healthy as well. The first is particularly good to help you keep away from colds. This is because it keeps your entire digestive system stirred up, increasing elimination of waste from the body.

Exercise Number One

Lie flat on your back, hands at sides. Draw your legs up and back so that your knees will come as near your chest as possible. Relax, and with hands still at sides **sit straight up.** Unless absolutely necessary, avoid using your hands in any way as a support.

Do this double drill at least fifteen times each morning (make yourself do them this number), for the first week. Then increase it to twenty-five, and on up as you find the stunt becoming easier. **But do it.** Getting into operation is what counts.

Exercise Number Two

Squat, balancing on your right foot, while slowly extending the left full length in front of you. If you don't at first succeed—well, you know the old saw about trying again and again. That is the secret of doing this one-leg balancing stunt—and you can find a great many athletes who cannot do it.

LIKE TO BUILD THINGS?
Modern Mechanix How to Build Manual contains hundreds of keen projects.

. . . over 3,500 athletes are now in Pictures. Studios are searching constantly for men with perfectly developed bodies. I have trained famous Stars, Directors and Producers, and have placed many of my students in film roles or on the stage. You have admired these men for their perfect physiques . . . now, let me give YOU a body that others will admire, envy and respect.

(Joe Bonomo in an "action" scene in a recent picture)

FREE TRIP TO HOLLYWOOD... FREE Screen & Talkie Test

Physical Culture Training won me a contract in the Movies and the title, "Hercules of the Screen." Since then I have been featured in more than 100 film roles. An amazing NEW System of Muscular Development gave me the most powerful body that has ever faced a movie camera here in Hollywood.

I'LL GIVE YOU MUSCLES MANHOOD...POWER...ENERGY

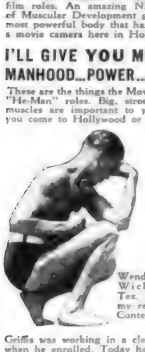
These are the things the Movies want for "He-Man" roles. Big, strong, rippling muscles are important to you whether you come to Hollywood or not. A perfect physique is essential to your success . . . you cannot afford to be a puny, little weakling. You want muscles that are useful, muscles capable of ACTION, POWER, ENDURANCE. And you CAN HAVE THEM and perfect health. In 90 days with my New System of Muscular Development you'll astound yourself and your friends with the feats you can perform with your muscles. You'll look like an athlete . . . and you'll BE AN ATHLETE . . . a real muscular HE-MAN.

PHYSICAL APPEARANCE Secret of Success and Popularity

I know what Movie Directors look for when they "size up" a new film player . . . I know what girls and women admire in a man . . . and what other men respect. A HE-MAN wins out everywhere. Let me pack that body of yours with sinew and strength. Let me fill out your chest; broaden your shoulders and give you a pair of mighty arms that will strain at your coat sleeves. I'll pep up your circulation; clear your skin; improve your nerves and make a MAN out of you in every sense of the word.

LOW COST...EASY TERMS

This course I'm telling you about is the same instruction I have given to famous Screen Stars—but I've brought the price down within the reach of everybody. I have a payment plan that makes it possible for you to start AT ONCE! Mail the coupon for the FREE Book today. It will tell you how YOU can get an Athlete's Development right at your own home and in a few short weeks. See what the famous Hollywood Stars say about my Course. LEARN HOW YOU CAN QUALIFY FOR A FREE TRIP TO HOLLYWOOD WITH A SCREEN AND TALKIE TEST. It costs nothing to investigate. Just mail the coupon!



Wendell Griffis of Wichita Falls, Tex. (Winner of my recent Movie Contest). Griffis was working in a cleaning plant when he enrolled. Today he is in Hollywood and has already appeared in Warner Bros.-First National short feature "To Health with It," and with Mae West in "I'm No Angel."

MAIL COUPON FOR FREE BOOK

Joe Bonomo, 204-E Bonomo Bldg., Hollywood, Calif.
Please send me your Free Book and all details of your Physical Training System and Movie Contest. I understand that this does not obligate me in any way.

Name .....
Street (or R.F.D.) .....
City .....
State ..... Age .....

NEW LOW PRICES ON
GOODRICH-Firestone
GOOD YEAR
U.S., FISK and OTHERS
$2.15
30x4.40-21
And we defy anyone to excel our quality. Every standard brand is reconstructed by our latest methods and method is positively guaranteed to give full 12 months service under ordinary road conditions. This policy is backed by the entire financial resources of an old reliable company. Monroe, N. C. Today's lowest prices.
YOU CAN'T BEAT OUR PRICES
SAVE ON YOUR TIRES
BALLOON TIRES
Size Rim Tires Tubes
29x4.40-21 $2.15 $0.85
29x4.50-20 2.25 .85
29x4.50-21 2.40 .85
29x4.75-19 2.50 .90
29x4.75-20 2.60 .90
29x5.00-19 2.70 1.00
29x5.00-20 2.85 1.00
29x5.25-18 2.90 1.15
29x5.25-19 2.95 1.15
29x5.25-20 3.00 1.15
29x5.50-19 3.25 1.15
29x5.50-20 3.35 1.15
29x6.00-18 3.40 1.15
29x6.00-19 3.40 1.15
29x6.00-20 3.45 1.25
29x6.00-21 3.50 1.25
29x6.50-20 3.75 1.25
Reg. CORD TIRES
Size Tires Tubes
30x3 $2.98 $0.85
30x3½ 3.95 .95
31x4 2.98 .85
32x4 2.98 .85
33x4 2.98 .85
34x4 2.98 .85
32x4½ 3.38 1.15
33x4½ 3.48 1.15
34x4½ 3.48 1.15
32x5 3.78 1.65
33x5 3.78 1.65
34x5 3.79 1.65
All Other Sizes
WE WANT DEALERS
ALL TIRES GUARANTEED Brand NEW
SEND ONLY $1 DEPOSIT on each tire ordered. We ship balance C.O.D. If cash in full accompanies order, deduct 5% discount. Allow for parcel post charges. Terms same 12 months' service required of large tires.
GOODWIN TIRE & RUBBER CO. Dept. 1840 S. MICHIGAN AVE. CHICAGO, ILL.
"RAY-O-VAC" FREE Flashlight Lantern With Order for 2 Tires
Complete with batteries and bulb. Ideal for emergency use. Household and motor necessity. Gives 500 foot range. Adjustable focus.
MEMBER N.R.A.
12 MONTHS WRITTEN BOND GIVEN WITH EVERY TIRE

NEW HEALTH and STRENGTH COURSE!
Health and Muscle Building Course that requires no apparatus or mechanical device to get the finest muscular development! Builds you inside, as well as out! Nothing like it ever offered before! Entirely new system! Results guaranteed! Send for yours TODAY! Price . . only . . $2.00
RALPH E. DOWELL
P. O. Box 244 Grand Junction, Colorado.

Learn to Dance
You can learn all the modern dances—the latest Tango steps, the new Fox Trots, Waltzes, Collegiate Steps, and popular Society Steps at home, easily and quickly. By our method you make dancing as easy as A-B-C. No music required. Learn in private. Be a wonderful dancer. Learn to dance complete—entire course. Over 64 illustrations, sent on 5 Days' Free Trial. Regular $25.00, course. Send no money. Pay postman only $1.98, plus postage upon arrival. Money back if not delighted. Unique Free.
Franklin Pub. Co., 800 No. Clark St., Dept. A-319, Chicago

PANDICULATE FOR HEALTH
BE WELL YOUNG STRONG
Booklet Free
Fifteen glorious minutes on Pandiculator better than two hours in gymnasium. Refreshes, rejuvenates. Helps retain youth, energy, vigor, vim. Wonderful results. Doctors recommend. No exertion. No discouragement. Delightfully restful. Write for Free Booklet.
PANDICULATOR CO., 643 Schofield Bldg., Cleveland, Ohio

HIGH-POWERED TELESCOPE
Most Powerful in America for the Money!
Genuine 15 power Multiple Lens Long Range Telescope. This giant telescope is powerful enough to see the craters on the moon or tell time on a church clock miles away. Approx. 3½ lens. Fine for Sea or Mountain travel. Powerful magnification. Sent prepaid for only $1.69 postpaid. C.O.D. 25c extra. SPECIAL-SUPER power 18X telescope, similar to above but more powerful, guaranteed to see 200 times larger in surface and 16 times closer, together with powerful microscope only $1.98 postpaid!
BROWNSCOPE CO. Dept. X4, 246 Fifth Ave. New York

U. S. Aerial Patrol Traps Smugglers

(Continued from page 54)

One of the most perplexing problems that ever confronted the sleuths of the aerial patrol existed a couple of months ago along the Canadian border near Buffalo. Again and again they had been positively informed that large-scale liquor smuggling was being conducted with the Canadian base of operations near St. Catherines, Ontario, and the American base, an improvised landing field near Lockport, New York, just outside of Buffalo.

Every attempt to catch the offenders had failed. Finally, however, an informer stationed near the Lockport field came upon some information that helped the Federal officers perform an ingenious bit of strategy.

How Liquor Smugglers Were Trapped

It seems that the pilot of the plane carrying the smuggled Canadian liquor would never land his illicit cargo unless two men wearing white sweaters were standing in the center of the field. If these men weren't present he'd know that something was wrong—perhaps Federal men were on hand—and would circle around the field until the proper signal was given and he had the assurance the coast was clear.

Immediately on learning this fact two Customs patrolmen drove to a point near the landing field and hid themselves and their car in the surrounding bushes. After a couple of hours wait they saw an expensive car drive onto the field. Sure enough, two men, both wearing white sweaters, got out. Pistol in hand the officers marched on the field and apprehended the men. Stripping them of the white sweaters the officers themselves put on the sweaters, forcing the men to hide in the nearby bushes.

White Sweaters Lure Plane to Earth

Pretty soon there was the characteristic whir of an airplane motor overhead. The pilot circled the field very cautiously, obviously to make sure his white-sweatered confederates were on hand. Not being able to make out the features of the white-clad sleuths, he evidently decided the coast was clear, and landed. The sleuths placed him under arrest after finding in his plane a huge cargo of liquor.

The saddest part of the incident was revealed by the pilot. He said that when first offered the smuggling job he had purchased the plane on the installment plan—$1,000 down and $100 after each trip. This last trip, he explained, was the very first in which he was supposed to make a clear profit, although he had made 30 previous trips. This added information, however, did not soften the hearts of the Yankee sleuths. They confiscated the plane and penalized the pilot $1,000. He is now back in his native Canada and isn't expected to visit the United States very soon.

Such episodes are commonplace in the life of Uncle Sam's aerial patrolmen. Like the Northwest Canadian Mounted, they always get their men, even though the mission brings them face to face with death.

Send for Free Copy of the Modern Mechanix Blueprint Booklet

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

Daring Death With Cameramen

(Continued from page 36)

prison authorities were determined to keep all photographers out. Naturally if other photographers who were barred noticed that one of my men "crashed," they would certainly "squawk."

Heart Beats Disturb Camera's Focus

Tom Howard, crack photographer of The Chicago Tribune, was enlisted for the special service. We decided that a Baby Ica camera with a Zeiss lens, described as F4.5, which is a medium speed lens, would be the necessary apparatus.

We held secret meetings in a hotel room in a quiet section of the city, where no one would suspect what we were planning or recognize us and lead to a revelation of our designs.

We tried attaching the little camera to various parts of his body. At first we experimented a good deal with Tom Howard's chest area, figuring that it would be in line with the subject. We found that breathing interfered with the exposure. It was surprising, too, how the heartbeat alone was sufficient to throw it off.

Finally we decided to attach the camera to his ankle, hitching it to a steel clamp there.

For an entire week we carried on our experiments in the hotel room under light and distance conditions we anticipated would prevail on the night of the execution in the Sing Sing death house. We perfected the pose so that Howard could keep the focus steady for 30 to 40 seconds.

Getting the Death Chamber Picture

The next problem was to get Tom Howard in the front row in the death chamber. An ankle camera would be of no use behind that line. We arranged to have two reporters with Howard. Each of the trio was to make an attempt to grab a front row bench. As it happened, Howard got a little lost in the scramble, but one of the huskier reporters survived the crush and surrendered a front seat to Howard.

The rest is history. Tom Howard got the picture which will forever remain an epic in the annals of news photography. It was a chance in ten thousand, and he made it.

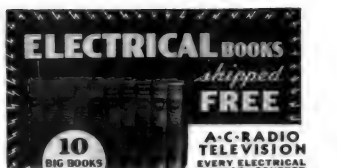
In the foreign field movie and newspaper cameramen often dare death to bring to the public graphic details of major world events. When the Japanese and Chinese forces were fighting in Shanghai, unarmed cameramen calmly ground away and reloaded plate after plate while bullets and shells fell all around them.

Newsreel Photographer Wounded in Riot

During the late uprisings in Cuba cameramen were on the job pictorially recording a revolution in the midst of angry mobs and whistling bullets. In a recent riot, in which six persons were killed and fourteen wounded, Joe Gibson, 46-year-old newsreel photographer, was shot in the leg.

To bring thrills to the public, cameramen have ventured to the very edge of roaring volcanoes and as molten lava rolled down toward them snapped pictures of volcanoes in eruption. Among the most thrilling of these was the moving picture of the eruption of Krakatoa, one of the most unusual and active submarine volcanoes, located in the Sunda Strait between Sumatra and Java.

(Continued on page 134)



Here's great news for anybody interested in Electricity. BRAND NEW 1933 edition of Applied Electricity brought right down to date with every NEW Electrical subject fully covered. 10 big Volumes and all shipped FREE for examination

For Beginners and Experts Over 2000 pages, thousands of illustrations—a veritable library—more of the kind ever published. Dynamos, motors, power stations, radio, television, everything electrical explained clearly so anyone can understand them.

BIG FIELD! Big Demand! Big Pay! Men who understand electricity are urgently needed right now in thousands of industries. Autos, airplanes, machine shops—practically every industry depends on electricity and men who know this subject make big money. Financial backers are willing to back men and do loans quickly with these books. Send coupon for a set for FREE examination and see for yourself

FREE A year's consulting membership in the Electrical Service Bureau. Helps you get more from life. Consult one of the famous Cyclopedia of Electricity. Many say, That's worth more than cost of books

AMERICAN TECHNICAL SOCIETY
Dept. E-9320, Drexel at 58th Street, Chicago

American Technical Society, Dept. E-9320, Drexel at 58th St., Chicago
Send for 10 days' free use, BRAND NEW 10-volume set of Electrical Engineering. In return for mailing this coupon promptly, send free certificate of membership in the American Technical Society entitling me to free consulting privileges for one year. I will pay the few cents delivery charges on the books. If I wish I may return them in 10 days and owe you nothing, but if I keep them I will send $3 00 after 10 days, then $3 00 a month until the special price of only $29 80 is paid

Name .....

Address .....

City ..... State .....

Attach letter stating age, occupation and name and address of employer and at least one business man as reference

WHICH CONTROLS YOU?

Science says that the chemical elements composing a man's body may be bought for sixty cents at a pharmacy shop. But the real part of you is the intimate, creative power within—it makes YOU a living, vital being.

By the proper use of this creative, sleeping force within you, you can DOMINATE YOUR LIFE and MASTER THE CONDITIONS WHICH SURROUND YOU. The Rosicrucians have shown thousands of thinking men and women how to use this infinite power. Learn to direct the inner processes of your mind.

This Free Book Explains

The Rosicrucians will send the SINCERE SEEKER a free copy of the new book, "The Wisdom of the Ages," which tells how you may become a student of these age-old truths. Address a letter (not a postcard of curiosity) to:

Friar L. C. H.

ROSICRUCIAN BROTHERHOOD
AMORC
SAN JOSE, CALIFORNIA

Read our monthly magazine, "The Rosicrucian Digest," at your Public Library.

NEWS SCOOPS!

Do You Know That

- Mae West has a "kid sister" who has had a strange career and who may soon become a great radio favorite?
- In her story a movie chorus girl tells all about her amusing and sometimes tragic experiences in Hollywood.
- A reporter recently encountered Garbo on the boulevard with screamingly funny results?
- It was a case of love at first sight with Jean Harlow and her husband and that their romance has been going on for months?
- Carole Lombard is admitting for the first time the real reason for her divorce from Bill Powell?
- There is an unusual inside story to Joan Crawford's romance with Franchot Tone?
- There is only one magazine in which you can find the exclusive stories behind these unusual facts?

Read them all in the
DECEMBER
issue of
SCREEN PLAY

• *If your news dealer is sold out send 10c in stamps or coin to* SCREEN PLAY *Magazine, 529 South 7th St., Minneapolis, Minn., and a copy of the December issue will be sent to you immediately.*

Daring Death With Cameramen

(Continued from page 133)

Krakatoa has erupted as many as 16,000 times in twenty-four hours. In 1883 its eruption destroyed the island at its base and caused a water wave 100 feet high that overwhelmed the coasts of islands for hundreds of miles. As a result 36,000 people were drowned and the wave, continuing around the Cape of Good Hope, was felt in the English Channel, 11,000 miles distant.

Movie Cameraman's Plane Catches Fire

Yet J. H. Bekker, cameraman in the service of the Dutch government, dared to go within 150 feet of the island to obtain a sound moving picture of one of Krakatoa's recent spectacular outbursts.

He risked his life to make a record of the great spectacle while tons of lava, rock, molten glass, sulphuric gas, live steam and columns of water thousands of feet high almost engulfed his boat. During a flight over the volcano, a wing of Bekker's plane caught fire from burning lava and the cameraman almost lost his life.

The finest sea disaster picture ever taken were made by an amateur with an ordinary folding camera. They were the photos of the sinking of the Vestris in 1928 and the photographer was Fred Hanson, a member of the crew of the ill-fated vessel.

While passengers and crew struggled for their lives on the sinking ship, Hanson risked his life to record the stark realism of tragedy at sea. He escaped just before the ship went down.

Thrilling Adventures Just Day's Work

A noteworthy picture assignment which illustrates how news cameramen face perils was the coverage of the big arsenal explosion at Denmark, New Jersey. The terrors of No Man's Land and Chateau Thierry were all crowded hundred-fold into the eight hours during which the explosions roared at the government arsenal.

Al Willard, a demon photographer if there ever was one, broke through all lines, with shells popping on all sides of him, mounted to a 100-foot tower in the midst of the blasting and there he "shot" away to the accompaniment of a booming serenade. His escape from anything but trivial injuries was miraculous.

News cameramen often have to pick precarious spots for their "act." Often they must stand at dizzy heights on the ledge of a skyscraper to get a special parade scene or show work going on across the street. As stunt-men they figure the professionals who walk wires and dive from heights into ten-foot tubs are pikers compared to them. It's a part of every photographer's daily routine to expose himself to some perilous, breath-taking adventure.

Police Club News Cameramen

Although it is seldom chronicled, a news photographer runs a greater chance of breaking his neck than some daredevil who is performing a stunt for him. But you seldom see that side of it.

Riots are mighty tough assignments on photographers. When cops and rioters or strikers are battling and bullets enter the fracas, somebody is bound to get hurt, but the "photogs" stick through the thick and thin of it to get their pictures. I recall some time ago when Passaic, New Jersey, policemen went on a club-

Daring Death With Cameramen

bing spree and whacked striking picketers near the silk mills there.

The cameramen "blazed" away and the following day the papers carried views of the so-called police atrocities. When the photographers' brigade appeared on the scene of hostilities that day, the police went to work on the picture lads. It was a case of clubs against cameras. Some of the photogs got bruised up a bit, but they also got pictures showing the cops in action and reproduced them. Harry Warnecke, a News studio executive, got a "shot" showing five policemen beating a Pathe News man.

Akron Crash, Year's Toughest Assignment

The year's most difficult story to cover pictorially was the Akron disaster off Barnegat Bay, New Jersey, on last April 4. We were faced with vague reports, an inaccessible locale, terrible weather conditions and heavy competition from our rivals. As ever, the public was eager to see a photographic report of this great tragedy.

The first intimation of the disaster came over the United Press wire at 1:52 A. M. It said: "FLASH NEW YORK—MACKAY RADIO REPORTS AKRON DOWN AT SEA." And that was all.

The News, as well as every other paper in this section, mustered every resource available to cover this overwhelmingly difficult assignment. We had three planes, three hired boats, and several automobiles pressed into service. Some 35 reporters and photographers were put to work by the News alone to tell the word-and-picture story of the Akron's doom. That one assignment cost several thousand dollars, which goes to show how vital pictures are to the modern newspaper. The news camera legion again braved the rigors and hardships of Jersey coast gales to bring back those precious pictures.

Flying Photographer Runs Big Risk

The flying photographer perhaps runs the biggest risk. When the flying cameraman must go,

(Turn back to page 125)

The Movie Sound Faking Studio

(Continued from page 49)

is to be reproduced, a slab of concrete is inserted.

Better rain than that which falls from the sky can be produced indoors. For some "spots," we use synthetic rain, while for others, we actually "mix" the real and the false. As a sound track of real rain is run, from the side of the scoring room comes the patter of tiny rocks and marbles and other small objects tumbling over low obstacles in a revolving drum.

One has what the other hasn't. We use real rain for distant water particles striking the earth or trees, and the synthetic to represent a "beating" rain, the kind that smacks down on a roof. Sometimes actual rain sounds like hail and when it falls into a pool of water it gives off a metallic click which sounds too mechanical for our purposes.

The rain and wind and volcano machines look simple—and are—yet from them come some of

(Continued on page 136)

Every Handy Man needs SMOOTH-ON No. 1

for stopping leaks in steam, water or gas pipes, mending cracks, or leaks in furnaces and boilers, radiators, tanks, sinks, pots and pails, making loose handles tight, tightening loose screws, hooks, locks, door knobs, etc., stopping leaks in automobile engine water jackets, in radiator, hose connections, gas tank and gas, oil and exhaust lines, making a fume-proof joint between exhaust pipe and tonneau heater, keeping grease cups, hub caps and nuts from loosening and falling off, etc. Hardens like iron and stays everlastingly tight.

To get perfect results, write to us for and *use* the Smooth-On Repair Book. Free if you return the coupon.

Write for FREE BOOK

Get Smooth-On No. 1 in 7-oz., 1-lb. or 5-lb. tins at any hardware store, or if necessary, from us direct.

SMOOTH-ON MFG. CO.
Dept. 69, 570 Communipaw Ave., Jersey City, N. J.

Do it with SMOOTH-ON

The Mach of 1000 Lights

METLMACH THE MODERN MACH

FIRE PROOF—WATER PROOF—100% SAFE

SALESMEN
One man sold 1000 gross in his spare time, earning $227.00. We want more men in every locality to do the same.

The only thing of its kind. A remarkable match, made of metal, that can be thrown in fire and water yet is unharmed, lights 1000 times, or more. SAFE. Ends fear of fires and danger to children. Needed in every home and by all campers or smokers. Cheaper, more convenient than old fashioned matches. Sells on sight. Try Metlmach for yourself and see why it has sold around the world in 90 days. Send 10c and a 3c stamp for sample METLMACH with full salesman's terms, or better still send $1 for 15 METLMACHES with all particulars, sell them for 10c each and make 50% profit.

METALMATCH CORP., 112 Water St., Warsaw, Ill.

GO TO HIGH SCHOOL AT HOME

MAKE up the education you missed. Study at home in spare time. Your choice of subjects. Expert instruction. Personal service. You make quick progress because you are in a class by yourself. Diploma. Mail coupon today for interesting FREE BOOKLET.

INTERNATIONAL CORRESPONDENCE SCHOOLS

"The Universal University" Box 2323-U, Scranton, Pa.

Without cost or obligation, please send me full particulars about the course I have checked—

☐ English ☐ High School Course ☐ Accounting
☐ Civil Service ☐ Bookkeeping ☐ Advertising
☐ Salesmanship

Name .....

Address .....

GOOD YEAR
Firestone-Goodrich
U.S. AND OTHER TIRES
2.15
29x4.40-21
DEALERS WANTED!
HIGH GRADE TIRES
You can reline it today, tomorrow, and probably for the remainder of the motorist. Lowest cost, increasing mileage, hundreds of satisfied customers all over the U. S. A. Be a private standard brand Tires, manufactured locally. Midland service through Midland dealers. Long, hard service on rough roads. Low cost.
50% TO 60% MORE SERVICE
BALLOON TIRES
Size Rim Tires Tubes
29x4.40-21 $2.15 $1.05
28x4.75-19 2.25 1.10
30x4.50-21 2.40 1.05
29x4.50-20 2.40 1.05
28x4.75-19 2.40 1.10
29x4.50-20 2.60 1.10
30x4.50-21 2.60 1.10
29x4.75-19 2.75 1.15
30x4.75-20 2.95 1.15
31x4.75-19 2.95 1.15
32x4.75-19 2.95 1.15
33x4.75-19 2.95 1.15
34x4.75-19 2.95 1.15
35x4.75-19 2.95 1.15
36x4.75-19 2.95 1.15
REG. CORD TIRES
Size Tires Tubes
30x3 $2.25 $0.95
30x3½ 2.95 1.05
31x4 3.25 1.05
32x4 3.45 1.05
33x4 3.45 1.05
34x4 3.45 1.05
35x4 3.75 1.45
—All Other Sizes—
ALL TUBES NEW
GUARANTEED
FREE WITH EACH ORDER FOR 2 TIRES
Send $1.00 Deposit with each tire ordered. Balance C.O.D. If you send cash in full deduct 5%. You are guaranteed a year's service or replacement at ½ price.
MIDLAND TIRE & RUBBER CO., Dept. 3723
1000-10 West Sixty-Third Street, Chicago, Illinois
1/3 MONTH WRITTEN GUARANTEE BOND
FREE
set of NON-GLARE HEADLIGHT REFLECTORS
50% more headlight power; prevents dangerous night dressing eyes.

Print Your Own
Cards, Stationery, Advertising, labels, paper, circulars, tags, etc. Save money and time. Sold direct from factory only. Junior Press $9.80, Job Press $11. Power $149. Do popular raised printing like engraving with any of our presses. Print for Others, Big Profits. Pays for itself in a short time. Easy rules sent. Write for free catalog of outfits and all details. The Kelsey Co., E-6, Meriden, Conn.
EXCELSIOR
Own this Radio for less than 3cents a day!
Send for New FREE Catalog—
DEAL DIRECT AND SAVE
⅓ to ½!

Try the 1934 Goldentone for 30 days FREE. Uses repeats. Received 92 stations, many over 2000 miles distant. More proof in FREE catalog.
$8.95 1 ton limit
FREE
Mail postcard or coupon. Ask for FREE catalog.
MAKE MONEY
Ask our agent. No selling experience needed. Catalog gives details of FREE sample offer.
3 Radios in one!
All AC DC Home Radio All Electric car radio
Operates from 6 or 12 volt supply without B batteries
Long or Short Wave
30 Day FREE Trial.
GOLDENTONE RADIO MFG. CO.
11700 Livernois Ave., Detroit, Mich.
Send me FREE catalog and agents proposition.
NAME
ADDRESS
CITY STATE
Make Money at Home
GROW our famous Fancy White Queen Mushrooms. Experience unnecessary—we tell you how. Buy all we grow at highest prices. Marketing facilities furnished. Illustrated book free. Write today!
AMERICAN MUSHROOM INDUSTRIES, LTD.
193 Woolmouth Bldg., Toronto, Ont.
Grow Mushrooms
YOUR SPARE TIME OR FREE
EARN up to $25 A WEEK at First

Build a Novel Cigarette Holder and enter $150 Prize Workshop Contest. See page 55.

The Movie Sound Faking Studio

(Continued from page 135)

the talkies' most ominous sounds. Recently we made and delivered in less than a day an earthquake with a background of a cyclone and the eruption of a volcano.

Faking Terrifying Volcano Noises

Bowling balls, rolled over padded wood strips in the revolving barrel, supplied the thunder rumble. The more immediate thunder claps came from thunder drums. The two wire machines supplied whistling wind, while a louder, deeper wind blew out from a blower. Several sticks of dynamite, buried deep in the earth several hundred feet from the microphone, furnished the low booms of the volcano. Recorded separately, these sounds later were "mixed" for the completed effects.

From an earth-shaking volcanic eruption to the squeals of beasts and birds of the barnyard was but a simple step when we turned, after "scoring" the volcano and earthquake, to a series of horns mounted on a music rack.

These once were organ vox humana pipes which had been tuned to a lower note. By blowing a sudden, short "burst" into one, I produced the grunts of a hog. With assistants blowing two more horns, a whole barnyard full of pigs and boars walked into the room!

Even Door Slam Is "Dubbed"

Sounds of people moving about in their homes are among the most difficult to synchronize naturally. The door in a movie set, on account of the high pitched flimsy construction, does not slam with the reverberation and boom that should come from a door slamming in the ordinary home.

So, when an actor stealthily slips a key into the back door, tip-toes up the creaking stairs and, finally, by mistake slams his bedroom door, you do not hear what you see.

These sounds came from a "door cabinet" and a small frame containing five stair steps. The box behind the door, which stands no taller than a child and is about three feet wide and three feet deep, supplies the reverberation of a room when the door is slammed.

And a resin-covered tongue of leather, inserted between the two wooden members of each step, which are held apart by a small spring, furnishes the squeak. If the door squeaks, that noise comes from a tight fitting joint rubbing against resin in a cylinder fixed alongside the cabinet.

With this device, one assistant can provide the click of a key or bolt, turning of the knob, squeak of opening and closing and the slam without moving from his position.

A vibrator, used in better days to massage an actor's face, hums to represent an elevator, whose gate and glassless door are built into one framework. Since an elevator gate gives out a metallic click, this part is made of iron.

But the door came from the carpenter shop and in its center may be inserted a pane of glass when needed, for an elevator door with glass tingles more than does a door of wood only.

Every week we invent new devices that rival and often surpass nature in the perfection of their tones. We seek constantly new ways of bringing to the screen sounds that are imperfect in themselves or the recording of which in the natural state are too costly.

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

Scientific Paradox Problem Contest

(Continued from page 66)

practically none of these particles and consequently nothing to scatter and reflect the sunlight. At this high altitude we can only see light when we are looking directly toward the source, which is the sun. The sky elsewhere appears black.

No. 2 The Sound Concussion Problem

Sound travels through air. The source of sound must be a vibrating body of some kind. The vibrations of the source set the air molecules immediately around it in motion. Each molecule in bumping into the molecule adjacent to it transfers its motion.

In this way the sound wave is transferred from one molecule to the next and so on to the ear. It is evident, then, that the closer the air molecules are together the more efficiently the sound waves will be transmitted. The phenomenon is well illustrated by placing an electric bell in a chamber which is so arranged that the air can be pumped from it.

Before the pumping is started the bell can be heard. As the air is pumped from around the bell, however, the sound will get weaker and weaker, until finally it will be inaudible.

Now return to the problem. At higher altitudes the air is less dense than at sea level. Therefore, at the top of Mount Everest sound cannot be transmitted nearly so effectively as at sea level because there are not as many air molecules to transfer the original sound vibrations. Thus, while the report of the French 75 would be deafening at sea level, it is comparatively weak at the higher altitude of Mount Everest.

No. 3. The Train Problem

Both trains must, of necessity, be the same distance from Chicago when they pass. They cannot pass unless, at the instant, they are at equal distances from Chicago. They are, of course also the same distance from St. Louis.

It was tragic the way many contestants who had submitted prize-winning answers to the first two problems tripped up on the train problem. It was, frankly, a trick question. The mathematical data was altogether irrelevant, given merely to mislead you. The contest editor took great malicious pleasure in watching contestants work out elaborate mathematical calculations which were totally unnecessary.

Honorable mention list follows: John G. Hanna, John F. Yeager, N. Bricknell, Frederick Gruenberger, Russell D. Lippitt, Edwin D. Loomis, Lt. J. R. Sutherland, Howard T. Lascon, W. G. Miller, Clyde W. Shuey, Elwyn J. Boice, Carl W. Fritsch, Wilfred Gibbs, Jr., R. P. Cecil, George Winslow, Sidney Frankel, Nelson E. Doerr.

HOW TO BECOME A RADIO AMATEUR

Booklet "How to Become a Radio Amateur" is available at Modern Mechanix and Inventions, 529 South 7th St., Minneapolis, Minn., for 25c. Tells how to build an inexpensive receiver and transmitter.

DRAFTING

BOOKS SENT FREE!
ON APPROVAL
5 VOLUMES BRAND NEW EDITION

For Beginners

Written, so you can understand every word, by 22 famous engineers and architects. DeLuxe flexible binding, nearly 2,000 pages, 1546 blueprints, charts and diagrams; prepares you for a good drafting job in mechanical or architectural lines. Sent for 10 days' free use if you mail coupon immediately.

Only 15 minutes a day with these WONDER BOOKS will prepare you for a good drafting job in less than a year. Mechanical and architectural drafting from simple straight lines to important complex plans. *A step at a time!* Built especially for beginners, for men with only grammar schooling. Drafting room practice, PLUS ENGINEERING, made easy and clear. **Includes complete course in blue-print reading.**

Big Field Big Demand Big Pay

Competent draftsmen are urgently needed right now in all building and manufacturing lines at $50.00 to $100.00 a week. That's just the beginning—FOR DRAFTSMEN HAVE THE BEST CHANCES FOR ADVANCEMENT. Pleasant, fascinating work, easy to learn and do. Learn quickly with these books—send coupon for a set FREE and see for yourself.

A year's consulting membership in the American Technical Society now given free to all readers of this famous cyclopedia of drafting. Many say that it is worth more than the cost of the books.

FREE

Complete set of drawing instruments if you send for these drafting books NOW. These instruments are made of the finest of German silver, are absolutely accurate and are packed in velvet lined leatherette pocket case. Real $10 value, but free to you with these books.

AMERICAN TECHNICAL SOCIETY
Dept. D9320, Drexel at 58th St., Chicago, Ill.

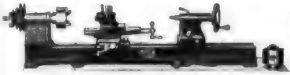
American Technical Society, Dept. D9320, Drexel at 58th St., Chicago, Ill.
Send for 10 days' free use New 5 volume set of drafting. I will pay the few cents delivery charges. If I wish, I may return books in 10 days and owe you nothing but if I decide to keep them, I will send $2.00 after 10 days, then only $3.00 a month until $19.80, the special introductory price, is paid. Send latest edition and include drawing instruments.

Name .....

Address .....

Attach letter stating age, occupation, employer's name and address and that of at least one business man as a reference.

NEW, LOW-PRICED DRIVER TOOLS



L501 Metal Turning LATHE $35.00

Three newly designed lines of DRIVER Power Tools in three distinct price classes are now available. Send for free catalog today and learn about these perfected machines. Such tools as the L501 Metal Turning Lathe, shown above, are built for perfect performance and long use at a minimum cost. The L500 Woodworking Lathe which is similar to this Metal Lathe sells for only $11.50. Other exceptional bargains are offered, too—get your free copy of this valuable book and examine the specifications. You'll be well rewarded.

WALKER-TURNER CO., INC.
12123 Berckman St., Plainfield, N. J.

FLYING BEN—Master of Them All

95% unbreakable. Can crash trees, walls, buildings without breaking. Shock absorbing landing gear. 35" ft. wing spread. 22½ inch fuselage. Weight 12½ oz. Flies 200 to 700 feet at one winding. Patented silent rubber motor. In a class by itself. Get yours now.

SPECIAL FACTORY PRICE TO YOU

This aeroplane is 75% built. Requires only simple assembly. For $2 extra you can get one completely built ready to fly. Shipped in a large box. Send for FREE colored folder which shows plane in flight and crashes.

ONLY **$3.95**

FLYING BEN MODEL AIRCRAFT CO.
2859 N. Parkside Ave. Dept. 22 Chicago, Ill.

Send for NEW CATALOG 17 Better Than Ever

For Boilers, Gas, Steam Engines, Castings for 40 kinds of these Engines. Pumps, etc., Electric and Water Motors, Gears, Material, Piston Rings, Miniature Bolts, Nuts, Gauges, Valves, Rails. Blueprints free with Castings. Send 25c for Catalog 17. Refund on 1st order. Canada 30c.

HOWARD ENGINE & MFG. CO.
2417 N. Ashland Ave.
Chicago Illinois

GOLD

HOW AND WHERE TO FIND IT

A book of the lore for gold-seekers. Tells where to look for, and how to find gold quickly. Often gold or buried treasure is on your own property, or nearby. Astounding facts given in this book that may be worth a fortune to you now. New lode and placer locations revealed that are rich in gold and silver. Valuable information on Rocks and Minerals. Everything explained. Master the science of finding gold from this new modern educational book, **"HOW AND WHERE TO FIND GOLD."** Easily understood. Thousands have benefited by the valuable instructions given. It contains: Handy pocket size attractively bound. **Now $2.** DON'T WAIT. send in your order today with remittance, or send 6 ℓ. in ℓ. S. A.

Guggenheim Equipment Co., Dept. 111-M, 110 Sutter, San Francisco

BUILD YOUR OWN BOAT!

Here's the Book for All Boat Bugs

At Newsdealers or Send 50c (stamps or coin) to
Fawcett Publications, Inc. 529 S. 7th St., Minneapolis, Minn.

Mr Cord—Titan of Transportation

(Continued from page 41)

salesman and made money speedily in Los Angeles agencies. He began to organize. He obtained backing for business—dealing with automobiles, of course—filling and greasing and washing stations.

While directing those he took a venture in transportation, operating a hauling service for mines in Arizona's mountains. Cord found mountain hauling as slow in producing profits as it was in its motion on the steepest grades of his route. He concentrated on the washing and greasing stations—and expanded.

Takes Over Auburn Auto Plant

The step he took toward widening his trade quickly proved too fast a step. He soon found he did not own the business and his only assets left were his native shrewdness, his sales ability and his knowledge of motors and wheels. He turned to a larger field to apply them—Chicago.

He was twenty-five years old in 1919 when he arrived in Chicago looking for a job. He sold Moon cars so successfully that he became a partner in the principal agency in the city.

Cord Drives in 10,000 Mile Test

But he wanted to make automobiles. He saw an opportunity. He consulted with bankers interested in the weakening Auburn Automobile Company. He became manager in 1924, then vice-president, then president. Auburn took on new life.

Cord, the former race driver, steered his company into pioneer fields in engineering, in design, in production methods. He studied metallurgy and applied discoveries. Auburn prospered as Cord kept the wheel.

Cord looked forward. He designed the first front-wheel drive automobile, the Cord, and made it popular. He took over the Deusenberg—and a little more than ten years after he "fixed" his first flivver, he was making the world's highest-priced automobile.

He made money, lots of it. His company's shares skyrocketed in the stock market, soaring to $500 a share in 1929. The world of business suddenly awoke to the fact that 34-year-old Cord controlled automobile factories and was buying aviation stock, while his fortune and prestige were growing rapidly.

Typical of Cord, the young genius learned the flying business from the pilot's cockpit. He received his flying license in 1929.

Soon after he formed the $125,000,000 Cord Corporation as a holding company for his interests. He had reached a giant's stature in finance. He aided in formation of two air lines while planning further invasion of aviation. He gained control of the Stinson Aircraft Company and built his own airplanes. He ordered 100 Stinsons made in his factory for his Century Air Lines and flew one of them.

Cord Defies Wall Street

In April, 1932, he sold his Century Air Lines and Century-Pacific to the Aviation Corporation for 40,000 shares of Aviation Corporation stock. He bought Aviation Corporation shares and enlisted associates in the move until he had enough stock to fight one of the greatest battles in financial history. He wanted to control Aviation Corporation.

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

Mr Cord—Titan of Transportation

Solidly entrenched eastern capital ruled Aviation Corporation, but young Mr. Cord was born in Missouri and he had that "you've got to show me" attitude. He issued an ultimatum: directors must not proceed with a secret deal to trade 2,000,000 shares of the corporation's stock for certain assets of the North American Aviation Corporation.

LaMotte F. Cohu, dominant in Aviation Corp., with the backing of the Lehman fortune in Wall Street, defied Cord. The young financial genius, however, went to court and got an order restraining the directors from making the deal. A fight to the finish became a certainty.

Cord said: "I personally will force Cohu out."

Wins Control of Aviation Corp.

The fight gained momentum through full page newspaper advertisements, asking 28,000 stockholders to offer proxies for each side in the battle for votes and control of Aviation Corp. Dramatically Cord flew from California to be present at the finish fight at the stockholder's meeting in Wilmington, Delaware.

And when the smoke of the battle cleared, Cord was the victor.

With control of Aviation Corp., Cord ruled American Airways. There was something to tinker with! Cord gave full attention to that great air mail, express and passenger line. Today he can claim a major achievement in transportation, for his own planes cover 72 cities in the United States and Canada, flying 37,000 miles every 24 hours, from coast to coast and from the gulf to Canada.

Becomes Taxi King of America

Cord, however, was not at the peak of his power. He became the taxi king of America. In 1933 he and his associates gained control of the Checker Cab Manufacturing Company and subsidiaries, including the Yellow Cab Co., Checker Taxi Company, Parmalee Transfer and Parmalee Transportation. Thus he owned the largest taxicab factory in the country, maker of 8,000 New York and 3,000 Chicago cabs.

The railroads came next. In August, 1933, Cord interests bought 100,000 shares of stock of the Kansas City Southern Railway, 20 per cent of the outstanding shares. Now Cord could run locomotives—could even take the throttle of one if he wanted to.

As yet the young conqueror of land and air transit had not reached out to the sea. Very recently he took a spectacular dive into ocean transportation. For $2,000,000 he obtained control of the New York Shipbuilding Company. It was one of the oldest builders of ocean liners in the country, having built 406 naval, passenger, and cargo vessels.

Shortly after Cord took over New York Shipbuilding the Navy Department in Washington gave Cord's shipyard a $38,450,000 order for two 10,000-ton cruisers and four destroyers. Cord shrewdly had foreseen shipbuilding as part of President Roosevelt's new deal. He got the biggest slice of the Navy's contracts.

Cord had driven his California flivver to a high peak in the world of transportation. Not only did he aid in moving Americans about by rail, by automobile, by airplane—but now he could make and tinker with battleships!

Become a Radio Expert

GOOD JOBS

Learn RADIO-TELEVISION ELECTRICITY-TALKING PICTURES

Times are getting better. Prepare to 1931. National will quickly train you to qualify for good jobs in all branches of radio, television, talking pictures, broadcasting, operating and general electricity. Through practical training. Over $100,000 in modern equipment. National graduates in demand. Regardless of age or education you can learn these profitable trades in a few months.

QUALIFY AS A
Radio Repair Man
Television Expert
Control Operator
Station Technician
Sound Expert
Ship Operator
Broadcaster
Electrician
and many other jobs

EARN ROOM AND BOARD WHILE LEARNING
75% of our students earn living expenses while receiving training. We help you get a job. For limited time will allow your coach railroad fare to Los Angeles.

TRAIN IN LOS ANGELES
This is the Ideal City. Center of Greatest Activity in Radio, Talking Picture and Electricity. 20,000 successful graduates. School established 28 years. Send for free descriptive book and enrollment details.

NATIONAL RADIO & ELECTRICAL SCHOOL-Los Angeles

Dept. MMR-12, 4006 Figueroa St.,
Send Book and full details of Courses.

NAME.....
ADDRESS.....
CITY.....STATE.....

Fits-kit FOLDING HACKSAW

MECHANICS • MOTORISTS • FARMERS

Here is the all-purpose tool that you have been waiting for! Something brand new! The famous Fits-Kit Hack Saw is just the tool you've always wanted to do a thousand and one jobs around the house, shop, camp, and car. Does the work of a saw, knife or hatchet. *Cuts wood, steel, or bone.*

FOLDS FOR KIT OR POCKET

Fits-Kit Hack Saw folds up for convenient carrying in kit, tool chest or pocket. *Built on an entirely new principle* that insures perfect tension of blade at all times. Made of cold rolled steel throughout and positively cannot get out of order. Has magazine in back for spare blades. Will last a lifetime. *The handiest tool you ever owned!* Send $2 for one today. *Money back if not satisfied.* AGENTS WANTED

Kit Manufacturing Co.
1726 Standard Avenue, Dept. 8
GLENDALE, CALIFORNIA

Fits-Kit

Social popularity: *warm friends:* a nice *soft job* with *big pay*, and a chance for *fame* and *fortune!* No, that is *not a "page dream."* Learn to play a Buescher Sax, and these things will *all* be yours. *Easy, too;* requires *no special talent.* Many, knowing *nothing* about music, master scales in *one hour*, join a band *in 30 days. You can.* But *only* with a Buescher Sax, Trumpet, Trombone in *rapid progress assured.* See your *local Buescher Dealer* today or write direct for catalog. Mention instrument. *Easy terms.* Big *gay* opportunities *now than ever before. Send today.*

BUESCHER Band Instrument Co. 2213 Buescher Blk. ELKHART, INDIANA 150

NO JOKE TO BE DEAF

—EVERY DEAF PERSON KNOWS THAT George P. Way made himself hear, after being deaf for 25 years, with Artificial Ear Drums —his own invention. He wore them day and night. They stopped head noises and ringing ears. They are invisible and perfectly comfortable. No one sees them. Write for his true story, "How I Got Deaf and Made Myself Hear." Also books of a Deafman. Address

Artificial Ear Drum

GEO. P. WAY, Inc., 741 Hofmann Building, Detroit, Michigan

WE MATCH PANTS

NRA

To Any Suit! Double the life of your coat and vest with correctly matched pants. **100,000 patterns.** Every pair hand tailored to your measure. Our match sent **FREE** for your O. K. before pants are made. Fit guaranteed. **Send piece of cloth or vest today.**

SPECIFICATION MATCH PANTS COMPANY
315 So. Dearborn St. Dept. 25 Chicago

DICTIONARIES—STANDARD ENGLISH

3 LETTER WORDS or 4-LETTER WORDS, 25c. both 25c. Verbatim Stnd. Eng. Words 25c. Lists of words winning first prize in recent Gold-Medal, Princess Pat, Pathfinder, Blesquick, Magnesia or Wheaties Contest, ea 5c. 3 for $1. 50 Lists of winners in 30 contests. 25c. Copy of Contest Magazine 25c. Full information on request. Dept. M-W DeLONG AGENCY, INC. Lafayette, Indiana

RAISE RABBITS FOR US

We Supply Stock and Buy What You Raise

PAYING YOU HIGHEST PRICES— Established 20 Years. Big Profits in Chinchillas, New Zealand Whites, etc. Easy to start. Big rabbit book catalog and monthly market bulletin showing prices we pay our breeders sent for only 10c. Address

Box 483 OUTDOOR ENTERPRISE CO., Inc. NEW CITY, Rockland County, N. Y.

Granite Carved Into Statues

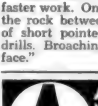
(Continued from page 45)

"All drilling is dry. On the head of the three figures, now roughly completed, the drill holes were from 10 to 12 inches deep, about three inches apart and set about six inches from the face.

"About a 40 per cent special gelatin dynamite is used in each hole. The cap wires of a row of holes, usually from 60 to 75, are connected and the charges in the row of holes are fired simultaneously by means of a 110-volt power circuit. The dynamite does its work rapidly and smoothly.

"When blasting has brought the work to within three or four inches of the finished surface, another procedure is employed for the final "sculpturing." Holes three or four inches in depth are drilled vertically into the face at intervals of about three inches over the entire surface.

"Chisel bits are used in this step, as they do faster work. Once all the holes have been drilled, the rock between is 'broached' out with the aid of short pointed steel gads driven by plugger drills. Broaching produces the finer finished surface."



PAINT SIGNS FOR YOURSELF AND OTHERS!

NO LESSONS OR EXPERIENCE REQUIRED. Letter Patterns make it very easy for you. Trace letters with pencil and fill in color with brush, and you have a neat sign any time you may prefer at practically no cost. Write today for free samples and full details

J. F. RAHN A2120 Neva Ave. Chicago, Ill.

FIGHT Tuberculosis!

Buy Christmas Seals

THE NEW AERO INTERNATIONAL ALL-WAVE 11 TUBE SUPERHETERODYNE DE LUXE

$29.75—Tubes $7.75

Amazing Round the World Receiver

With 2 matched dynamic speakers, 15 to 550 meters. Automatic volume control. Listen in direct to London, Paris, Berlin, Sydney, Buenos Aires and other stations throughout the world.

Aero World Wide 1 Tube Short Wave Receiver

For headphone operation—15 to 550 meters. With amplification can be used on loud speaker. For the last seven years this little wonder set has been one of the biggest sellers in the Short Wave Field. Write for complete Free Catalog.

CHAS. HOODWIN CO., 4240 Lincoln Ave., Dept. B2, CHICAGO, ILL.

Price **$5.95**

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

Fortunes in Needed Inventions

(Continued from page 95)

fasten and unfasten and it must never come loose while the car is in motion.

Electric Clothes Dryer

An electrical heater of small size with some sort of a folding wire rack that would hold at least ten pieces of wearing apparel for drying would be a boon to the lady living in a small apartment or in a rented room. It should be made to sell for a small amount, say one dollar more than the average heater without the drying rack.

Sprayer for Furnace Ash Pits

Some means of arranging a water sprayer in the ash pit of a furnace so that the ashes may safely be sprayed to prevent excessive dust without in any way risking the sudden chilling and breakage of the furnace grates. This would be one of the biggest boons to housewives since the invention of the vacuum cleaner and if the reader of this does not believe this let him ask a few ladies!

Heat Conserver for Furnaces

And speaking of furnaces, be it known that the man who can find some method of preventing the escape of heat up the flue pipe will not only save this country millions of tons of coal annually but he will also win the everlasting gratitude of home owners and coal users the world over. They will be glad to pay him a price that will be far beyond his wildest dreams.

Smooth Action Nail Clipper

A nail clipper that will perfectly clip the nail on one finger with a single operation leaving an edge that does not need to be filed. The royalty on such an article would run into a very large figure each year.

Die Sharpener

A machine that will grind and sharpen dies without removing the dies from the presses. Such a grinding tool would save a great deal of time and money in the larger factories that operate from ten to two hundred punch presses. The inventor of such a thing should have little trouble obtaining $75,000 for an outright sale.

Galaxy of Huge Bridges

(Continued from page 64)

realized that the Frisco bridge is four times and a half as long as the span bridged on the Hudson by the Washington structure.

The size of the caissons which must be built and sunk to enable piers to be built has called forth one of the most novel engineering proposals of recent years—still another bridge, a "Walking Bridge" if you please—which will walk to the location with the caisson and there accurately sink it upon the exact spot required.

Caissons are an essential impediment to bridge building of this type, and they are hard to handle in tide rips or rivers which have currents. M. Clemients, French engineer of Paris, has proposed a mobile structure which could pick up the caisson and either by walking with it, or on caterpillar treads, move to the spot desired to muck the caisson in.

INVENTORS
PATENT
YOUR IDEAS

Write today for FREE BOOK, HOW TO OBTAIN A PATENT and RECORD OF INVENTION—or send Drawing or Model of your Invention for Examination. MAIL COUPON TODAY!

Promptness Assured with Best Results

MILLER & MILLER
REGISTERED PATENT ATTORNEYS

1638 Woolworth Bldg., Dept. B. New York
203 MILLER BLDG., WASHINGTON, D. C.

NRA
WE DO OUR PART

Please send me your Free Book, "How to Obtain a Patent," and your "Record of Invention" form.

NAME .....

ADDRESS .....

PATENT YOUR IDEAS
REGISTER YOUR TRADE-MARK BY
REG. PATENT ATTORNEY PRIV. ENGINEER

E. H. POLACHEK
1234 BROADWAY
31st NEW YORK

WHAT IS YOUR INVENTION?
Send me a simple sketch of a model for CONFIDENTIAL ADVICE—DO IT NOW!

COUPON
Please send me full information and literature about Patent Protection without obligation.
Name .....
Address .....

PATENTS
BOOKLET FREE — HIGHEST REFERENCES
PROMPTNESS ASSURED — BEST RESULTS
Send drawing or model.
WATSON E. COLEMAN
724 9th St., N. W. Patent Lawyer Washington, D. C.

FREE RADIO CATALOG
1934 RADIO CATALOG
Write for our new catalog . . . most complete line of latest radio sets, service men's supplies, replacement parts at lowest wholesale prices.
ALLIED RADIO CORPORATION
833 W. Jackson Blvd. Dept. B Chicago

How to Become a Radio Amateur
Want to get on the air with a short wave transmitter and receiver? Our little booklet "How to Become a Radio Amateur," price 25c, tells you how.
MODERN MECHANIX AND INVENTIONS
529 South 7th St. Minneapolis, Minn.

ELECTRICITY

GET THIS 96-PAGE BOOK

BOYS—and grown-ups, too—will find "Fun with Dry Batteries" a most instructive and entertaining little book. Make electro-magnets, bells, buzzers, signals, lights, secret locks, electro-plating outfits, telegraph instruments, and numerous amusing electric toys. Has simple, illustrated description of principles of electricity—and of dry batteries in particular. Sent postpaid for only 10c, coin or stamps. *Address National Carbon Co., Inc., Dept. MMI, New York City.*

10c

METAL-WORKING

LATHE

Precision equipment for the small shop. New designs and manufacturing processes make this amazing bargain possible. Complete metal-working lathe with compound slide-rest, combination universal face-plate and chuck and full set of change gears. 24" length of bed. Shipped express charges C. O. D. Lathe for wood turning alone, $4. Attachments for milling, grinding, sanding, saw, new table, etc., available at low prices. Order from us at once and have a

$7.50 COMPLETE

AMERICAN MACHINE & TOOL CO. 120 Broadway, Dept. R-5, New York

---

LEARN HOW **SIGNS and SHOW CARD WRITING**

POSTERS—*Pictorial Bulletins*. Advertising layout; commercial lettering; fashions; illustration. Individual instruction. Practical training. Write today for free book. Detroit School of Lettering, 2813 W. Grand Blvd., Detroit, Mich. Founded 1899.

SEND FOR FREE BOOK OF FACTS

AUTOMOBILE COMPASS

Have you ever taken the wrong road and traveled many miles before discovering your mistake? This new AIRPLANE TYPE COMPASS constantly tells your direction of travel. Sticks to windshield. Illustrated folder free. ONLY $1 in. POSTPAID. SATISFACTION GUARANTEED or your money refunded if returned within ten days.

Agents Wanted!

HULL MFG. CO., Box 245-A, WARREN, OHIO

BUILD THIS MODERNISTIC CAR

for as little as $25

The car the country is talking about. Speed 50 miles an hour, 40 miles per gallon. Send $1 for detailed description or $2.5 for blueprints.

WILLIAM LUSK

2614 S. Clifton Park Ave., Chicago, Ill.

Do Your Own Broadcasting!

$1 Postpaid

NEW 1933 MASTER MIKE WITH MIKE RING AND HANDLE

Reproduces your own voice through your radio. Fools your friends! A million dollars' worth of fun. Easy to connect. Fits any radio. A real microphone—not a toy. Mailed postpaid, only $1. Send today.

MASTER MIKE CO. 4510 Grand River Ave. Detroit, Mich.

FREE to BOYS

Sample Copy of OPEN ROAD for BOYS filled with 96 pages thrilling stories, pictures, sports, mystery, etc. Free membership in WINNIT CLUB, badge button, big outfit, catalog and new plan for getting easy money and swell prizes. Big surprise, too! ALL FREE! No obligation.

Write today to **WINNIT CLUB 40**

Open Road For Boys

130 Newbury Street, Boston, Mass.

QUIT TOBACCO

No man or woman can escape the harmful effects of tobacco. Don't try to banish unaided the hold tobacco has upon you. Join the thousands of inveterate tobacco users that have found it easy to quit with the aid of the Keeley Treatment.

KEELEY

Treatment For *Tobacco Habit* Successful For Over 50 Years

Quickly banishes all craving for tobacco. Write today for Free Book telling how to quickly Free yourself from the tobacco habit and our Money Back Guarantee.

KEELEY INSTITUTE, Dept. D-757, Dwight, Illinois

Home of the famous Keeley Treatment for Liquor and Drugs. Booklet sent on request. Correspondence strictly confidential.

HAENEL "100 SHOT" REPEATER

$4.95

Latest Model 1933 Haenel repeating pistol. Sturdy, massive construction, easy cocking lever, 100 shot magazine. Accurate for target. Powerful for small game. Blue or Nickel finish, shoots B. B. steel shot. Weight 2½ oz. Price with 500 shots Free - $4.95—$2.00 deposit on C.O.D. *Free Catalog—Colts, Y-Bill Rifles, Binoculars, etc.*

HUDSON SPORTING GOODS COMPANY

M-52 Warren Street New York City, N. Y.

Chucks for Small Lathes

Lowest Prices Ever Offered

A quality tool, accurately made. Send draft or money order. If not entirely satisfied, return chuck in 5 days and we will refund your money.

3 INCH $3.87

4 INCH $4.87

Postpaid

5 Inch Chuck $8.87; 6 Inch Chuck $9.87

JOHN L. ALEXANDER 11911 Woodward Ave. Detroit, Mich.

DIABETES

Can be successfully treated at home with Melatol. It goes direct to the cause of your illness, comes in capsule form and permits more normal eating. Write to laboratory No. 4 for full information giving your sex, age and duration of sickness. No obligation. *The Melatol Co., 593 Market St., San Francisco.*

BUCHSTEIN'S FIBRE LIMB

is soothing to your stump—strong, cool, neat, light. Guaranteed 5 years. Easy payments. Send for Catalog today.

I. Buchstein Co. 810 3rd Ave. So. Minneapolis, Minnesota

Also fibre arms, and braces for all deformities.

STAMMERERS

Write for Free List of ethical schools that successfully correct all speech defects.

STAMMERERS' GUILD Suite 404 Boston, Mass. 18 Newbury St.

ELECTRIC MOTORS for Any Requirements

110 volt A. C. or D. C., Midget Motor, 1-2000th H. P., completely assembled, tested and guaranteed.....

$2.00

(Sent postpaid on receipt of price)

Also all types of motors up to any size for any voltage or kind of current. Let us know your requirement.

HARTFORD CLOCK CO. 280 Central Ave. Jersey City, N. J.

Thank You for Mentioning Modern Mechanix and Inventions for December When Writing to Advertisers

STOP Your Rupture Worries!

C. E. Brooks, Inventor

Why worry and suffer with that rupture any longer? Learn about my perfected invention. It has brought ease, comfort and happiness to thousands by assisting in relieving and curing many cases of reducible hernia. It has Automatic Air Cushions which bind and draw the broken parts together as you would a broken limb. No obnoxious springs or hard pads. No salves or plasters. Cheap. Sent on trial to prove it. Beware of imitations. Never sold in stores nor by agents. Write today for full information sent free in plain, sealed envelope.

H. C. BROOKS 562 J State St., Marshall, Michigan

5 Master Keys

Work like magic in emergencies or prove whether your door or padlocks are burglarproof. OPEN AND TEST THOUSANDS OF DIFFERENT LOCKS. Recommended by users in ten different nations. Most wonderful and only keys of their kind. Send $1 today. (Also C.O.D.) Novel key chain FREE. Each key different.

LA VALLIERE, 75 FOURTH AVENUE, NEW YORK, N. Y.

HIGH BLOOD PRESSURE

Quick Relief, or You Only Pay When Satisfied

If you suffer from High Blood pressure, dizziness, ringing in the ears, can't sleep at nights, feel weak and shaky, bad taste, nervous. If your heart pounds and you have paralytic strokes, to demonstrate Dr. Hayes' prescription we will send you postpaid, a regular $1 treatment on absolutely FREE TRIAL. While it is non-operative, many cases report remarkably quick relief; often symptoms diminish and normal sleep returns within 24 hours. Contains no salts, physics, opiates or dope. Safe with any diet. PAY NOTHING UNLESS GREATLY IMPROVED. Then send $1. If not your report cancels the charge. Write Dr. Hayes Ass'n. 3133 Contes, Kansas City, Mo.

100 SHOT REPEATER Hasnel Air Pistol

FOR XMAS GIFTS

For target practice, small game, etc. Young men or grown-ups will find these ideal. Well made, strong, powerful, easy loading; nickel or chrome finish, wood stocks. 7" over all; wt. 1 lb. **FREE** 500 Steel BB's and fine Leather Holster **$4.95**. *Ship this, Send in Use 45th. $2 Deposit on C.O.D.'s.*
Single Shot Kentra: 300 BB's and Target. Free **$2.45**.
Catalog: Firearms, Air Guns, Micro & Telescopes, Binoculars, etc. Send stamp. **M. Lee Sales Co., 35 W. 32nd St., N. Y. City.**

LEARN BOXING, WRESTLING, JIU JITSU

Books 25c each subject. Complete Illustrated instructions. Great Strength easily obtained by following my instructions and using my exerciser 15 minutes a day. 25% increase in Strength guaranteed in 7 days. Send $1 for complete course and exerciser. Satisfaction guaranteed or $1 refunded.

PROF. J. A. DRYER
Box 1850-R Chicago, Ill.

$150 Cash Prizes for Novel Cigarette Holders—
See Page 55.

STOP TOBACCO?

Banish the craving for tobacco as thousandshave. Makeyourself free and happy with Tobacco Redeemer. Not a substitute, not habit forming. Write for free booklet telling of injurious effect of tobacco and dependable, easy way to relieve the craving many men have.

Newell Pharmacal Co. Dept. 491 St. Louis, Mo.

FREE BOOK

Be a Civil Engineer! Learn at Home!

Cyclopedia of Civil Engineering
7 great volumes. 2,500 pages. 1,600 Illustrations. New edition just off the press, by twelve of America's greatest engineers. Includes: Surveying, bridges, railroads, steel structures, municipal engineering, water supply, road building, etc.

Spanish Grain Flexible Covers Gold Stamped

Earn $5000 a Year—and Up!

"CIVIL ENGINEERING"—in plain English written so you can understand it, even if you have only limited education—explains how to get and hold railroad, structural or public works position. Covers every branch of Civil Engineering practice. Also a reading course for the ambitious student and an authoritative reference work for the engineer-in-training. Borrow a set—free. Look over the text questions which help you master each subject quickly. Mail the coupon without obligation today.

American Technical Society
Dept. C-9320, Drexel at 58th St., Chicago

Loaned Free!

To prove you can learn Civil Engineering at home in your spare time. And because no description, however could do it justice, to let you see for yourself the wonderful scope of the Cyclopedia, we will loan the first set of the great home reading course. Cost and terms are within your reach. Borrow no money—just mail the coupon.

American Technical Society,
Dept. C-9320, Drexel at 58th St., Chicago

I want to BORROW the CIVIL ENGINEERING Cyclopedia for 10 days FREE. I will gladly pay the few cents postage. But I am not sending for the set to buy. I may return it within 10 days. If I wish to keep them I will send you $2 after the 10 days—then $3 a month until special advertising price $29.80 is paid. Send latest Edition.

Name .....

Address .....

(Attach letter stating age, occupation, employer's name and address)

NEW! Build POLLYWOG This Winter

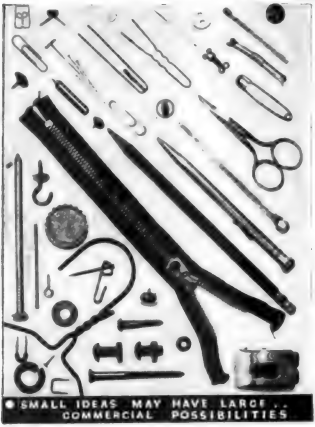
$22.50 STARTS YOU!

Complete Kit Less Sail $79.50

Anyone can build POLLYWOG—America's latest centerboard cat-boat—in one-half usual time with exclusive, new, Mead construction method! Kit includes finished morticed frames, transom, Sitkelamb cut to shape, RUSH 10c for sample Photographic Step-by-Step Building Method and Illustrated Circular! Hurry!

MEAD GLIDERS
12 S. Market St.
Dept. M-12
CHICAGO

PATENTS



Delays are Dangerous in Patent Matters

THE FREE BOOK shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing — securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

I Serve You Quickly and Secretly

Anything you write me or send me is strictly confidential between us. All letters and drawings are kept in strong, steel, fireproof files, which are open only to myself or authorized members of my staff. I have secured patents for inventors located in every state in the Union. My organization is a large and efficient one. My practice is confined entirely to Patents, Trademarks and Copyrights. I have had years of experience in Patent Matters. When you place your idea in my hands, I am in position to proceed at once to secure protection for you. My fees are reasonable, and, if you desire, I can arrange convenient terms of payment.

IMPORTANT!

Please understand that you are not under the slightest obligation in sending for this book. I will mail it, together with the Record of Invention form, the same day I receive your request. Use the coupon on next page to save yourself time and trouble. After that, you will be in position to proceed or not as you choose, to make your application for a patent.

• • • • •

CLARENCE A. O'BRIEN

Registered Patent Attorney

317-A Adams Bldg., Washington, D. C.

(Practice Confined Exclusively to Patents, Trademarks, Copyrights)

RECORD OF INVENTION BLANK *Free*

I will send you my Record of Invention form FREE. This blank will enable you to make a sketch of your idea in proper form and have it witnessed in such manner that it may be of value to you as evidence should the occasion for evidence arise. In my book, I tell you how to use this form to protect your interests.

My Location in Washington

MY offices in Washington are convenient to the Patent Office, and I and my assistants can, therefore, appear promptly before the officials and Examiners.

Reasonable Fees and Convenient Terms

I have served thousands of inventors in all parts of the United States and I am able to serve you very reasonably and extend liberal terms of payment. So don't waste valuable time.

and this Free Book *Tells How*

How your Patent Application is made; what kind of sketches or drawings are necessary; what other papers must be made out; how the Patent Laws protect you; why it is important to avoid loss of time in getting your application filed; and many other important points. Even a very simple idea, if new and useful, may prove very valuable. You may have much to gain and nothing to lose by sending for this book TODAY.

Mail Coupon NOW

CLARENCE A. O'BRIEN
REGISTERED PATENT ATTORNEY
317-A Adams Building
WASHINGTON, D.C.

Please send at once your FREE book, "How to Obtain a Patent" and your "Record of Invention" form.

Name .....

Address .....

.....
(Be sure to write or print name clearly)

New Quick Relief Works Faster—

Medical authorities discover new scientific facts about cause and relief of pain—new formula stops pain by relaxation—quickly—safely—scientifically

PHYSICIANS now say that most Headaches, and other severe pains are caused by (1) Acid Stomach or (2) Nervous Tension.

MODERN DOCTORS prefer HEXIN—an amazing new scientific formula—because it is *alkaline* and because it relieves pressure on nerve ends (the cause of pain) by *relaxing* tense muscles (the cause of this pressure). Users say they are getting relief with unheard-of speed.

BECAUSE HEXIN IS ALKALINE, it does not upset the stomach as acid tablets do. No druggy after-effects either. Just lightning-quick relief.

Modern Druggists Prefer HEXIN

Buy a box of HEXIN *today. If your druggist should not have it on hand, insist that he order it. You can buy* HEXIN *in convenient tins containing 12 tablets and in economical bottles of 50 and 100 tablets. Don't let your druggist give you anything but* HEXIN. *Nothing else is "just as good".*

GIVE US A PAIN COMBATANT—mothers asked—that our children can take with safety. Give us a relief for pain and fever that is milder and better adapted to the delicate systems of children than ordinary tablets—so strong and so acid*.

SO HEXIN—an alkaline formula—was originally developed for children. Its action had to be gentle and safe. What's mild enough for your child is better for you. But don't be misled about the effectiveness of HEXIN for adult use. The action of HEXIN is mild but RELIEF IS IMMEDIATE.

IN TRYING TO BREAK UP A COLD, do not add acid* tablets to an already acid stomach. HEXIN relieves colds by striking at the cause. Most people find that 1 HEXIN tablet every hour until 6 or 7 have been taken keeps a cold from starting or greatly relieves one that has started.

BUY HEXIN at any modern drug store. Take 2 tablets with water. At once, nerves start to relax. At once, HEXIN starts to combat acidity. Before you realize it, you are freed from those two *invisible competitors—pain and discomfort.*

MAKE the only test that counts. Try HEXIN yourself at our expense. Mail the coupon now. You'll never know what quick relief is till you try HEXIN.

*HEXIN is *ALKALINE* (non-acid).

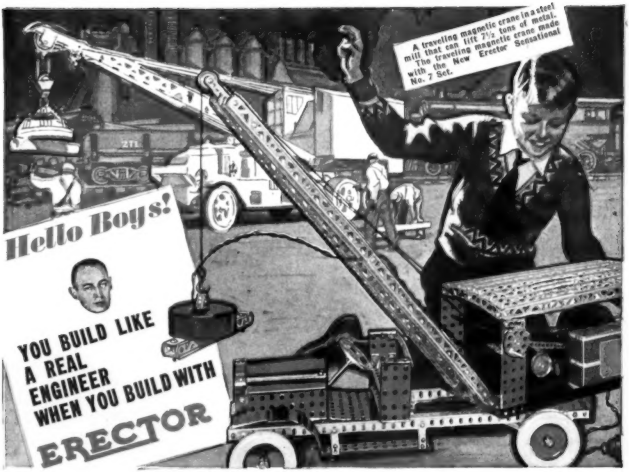
HEXIN, INC., 8 South Michigan Ave., Chicago, Ill.

Please mail me a generous free sample of HEXIN. MM-1125

Name_____

Address_____

City_____ State_____



HOW would you like to be an automobile engineer and build a big motor truck? Put it together—piece by piece—with your own hands. How would you like to construct a giant steam shovel, with a real electric motor—a drawbridge that actually opens and closes—a towering ship crane such as used in Uncle Sam's Navy Yards—an aeroplane—and other thrilling engineering marvels?

Boys, being an engineer is the most exciting thing in the world. And that's just what you are when you have a New Erector. My New Erector is twice as much fun as ever before. You can make more realistic models. You can make them easier and quicker.

TUNE IN—"Engineering Thrills." True stories about real engineers and their hair-raising adventures in digging the Panama Canal, building bridges and skyscrapers.
WJZ Network—Sundays, 6:45 P. M., E.S.T. See local program listing.

The NEW ERECTOR Sensational No. 7 Set

Contains the powerful Gilbert 110-volt motor, all-purpose gear box, girders, gears and other real engineering parts for building magnetic crane, fire engine, automatic elevator and over 160 action models.

Erector Sets start at $1.00. Be sure to see the Famous No. 4—the "Super-6" Erector—and the Sensational No. 7.

My Great Erector Prize Contest—Free Automobile Grand Total of

1,021 PRIZES!

Here's the greatest metal-model prize contest ever held. First prize is a free trip to Panama Canal, or Boulder Dam or Empire State Building or any other engineering project in the U. S. you want to see. Second prize: Chevrolet automobile. And over 1,000 other prizes.

Mail coupon today for illustrated "Look-Em-Over" Book and entry blank for prize contest. Then go to the nearest toy store and select your Erector. Take your Dad along. And good luck in my big prize contest.

Your friend,

A. C. Gilbert

FREE CLIP THE COUPON

Mr. A. C. Gilbert, The A. C. Gilbert Company,
377 Erector Square, New Haven, Conn.

Send me the big colored Erector "Look-Em-Over" Book and entry blank for the Erector prize contest—both free.

Name .....

Address .....

City ..... State .....

BEWARE RUPTURE

THAT "DOESN'T BOTHER MUCH"

Suction Cell Retainer is the newest invention for rupture. No bulk, no slipping. Holds and lets Nature heal.

Light as a Feather

Yet...Holds Rupture!

An Ohio Scientist Is Now Helping Nature Rescue Thousands of Rupture Victims. No More Cruelty. No More Cumbersome Contraptions of ancient times. His new appliance works without embarrassing bulk, without leg straps or springs or bars or leather. You will be astonished at its tiny size, its revolutionary coolness and convenience. His test offer actually includes an extra appliance sent to you absolutely FREE. Mail coupon today for the most astounding rupture information you ever read. It is Free and will come in plain cover.

NOW rupture victims can abandon the needless pain and discomfort of torturous trusses. Science has at last developed a tiny, comfortable appliance of tremendous interest for every rupture sufferer. This device is called "Suction Cell Retainer." It has been developed and perfected as a result of having made more than a million rupture appliances. With it comes an astounding natural help for putting real strength into the abdomen, so as to aid Nature in preventing recurrence of rupture. Results with Suction Cell Retainer are often so remarkable, so quick, so simple, that you too may marvel. It has no leg straps. It expands and contracts as easily as your own flesh. When you walk, run, bend, or exercise it tends to squeeze itself, not the part of your body it rests against. It is so entirely lacking in bulk and weight that even some ruptured men's wives have not known they were ruptured.

PERSONAL GUARANTY

Suction Cell Retainer must give the results that you expect or you simply return it. If your rupture is not actually and positively reduced in size during the free trial we allow, send it back and demand the return of your deposit as agreed. If 30 days' trial are not enough, write us and we will extend the time to 60, 90 days or even four months if you desire.

Think what the above words promise, not only in new comfort and immediate relief, but also the possibility of ultimate FREEDOM! No system like this ever devised! At last, comes sensible relief. Pleasant, Solid Comfort. Natural way. Reasonable in price. And you don't need to wait forever for results.

GET FREE OFFER

Send no money. Just mail coupon and you will receive our newest book about rupture, together with our attractive, home-trial offer of special FREE appliance, all in plain packet. It will open your eyes.

NEW SCIENCE INSTITUTE
2515 New Bank Bldg., Steubenville, Ohio

NRA
WE DO OUR PART

NEW SCIENCE INSTITUTE,
2515 New Bank Bldg., Steubenville, Ohio

Without obligation or a penny of cost to me, send free special rupture book, offer of extra appliance absolutely FREE, etc., by next mail in plain packet. I am ruptured.

Name .....

Address .....

City ..... *State* .....